REPTILES

OF COSTA RICA

A FIELD GUIDE

TWAN LEENDERS

Maps

On distribution maps, the thicker contour lines indicate an elevation of 3,275 ft (1,000 m); the thinner contour lines indicate an elevation of 6,650 ft (2,000 m).

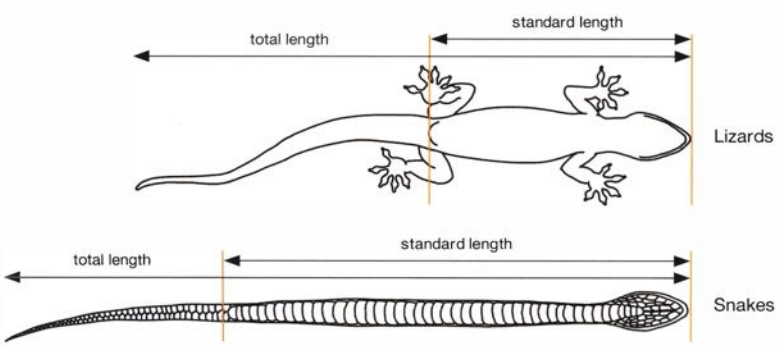
Yellow shading indicates the species' currently known range.

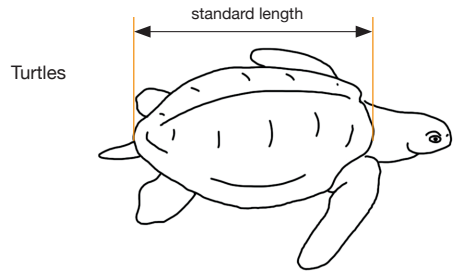
Note that the similar species presented at the end of each account are usually known to (potentially) co-occur with the species described in that section. If a very similar-looking species that does not have an overlapping distribution range is presented, this is clearly indicated.

Costa Rica contains six ecoregions that are relevant to local reptiles (see p. 3). Each species account in this book displays an ecoregion bar that indicates the primary ecoregions where a particular species is expected to occur.

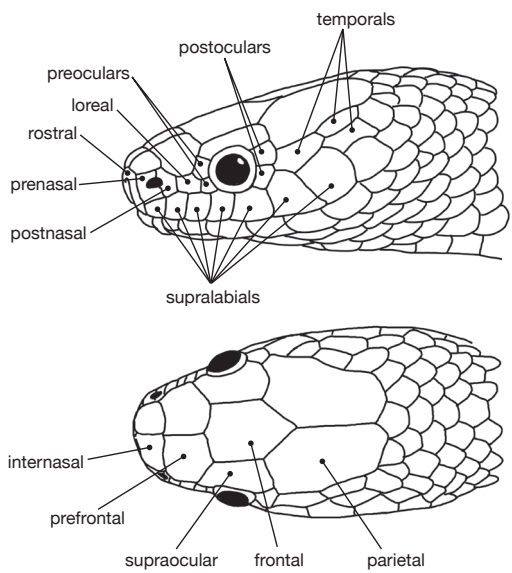
Measurements

The standard length of crocodilians, lizards, and snakes is generally defined as the straight-line distance between the tip of the snout and the posterior edge of the vent (essentially the length of the head and body combined); the total length includes the length of the tail (which may be broken or incomplete in some cases and is generally not the best measure of an animal's size). For turtles, the standard length is defined as the distance between the front edge and rear edge of the carapace, measured in a straight line.





Scalation Nomenclature



Conservation Status

The gold standard for conservation status designations is the International Union for the Conservation of Nature (IUCN) Red List, which is available online at www.iucnredlist.org and is regularly updated. The IUCN provides range-wide conservation assessments for many species, based on the size of their entire distribution range, abundance, habitat preference, and other factors. In some cases, the local conservation status of a given species may deviate from its global status. For example, a species whose range only barely reaches Costa Rica can be rare locally, despite being common outside of the country. The conservation status indicated in each species account is based on the results of a 2014 evaluation of the country's Red List for amphibians and reptiles, presented in the following report edited by G. Chaves, F. Bolaños, J.E. Rodríguez, and Y. Matamoros: *Actualización de las Listas Rojas Nacionales de Costa Rica: Anfibios y reptiles, Escuela de Biología* (San Pedro, San José, Costa Rica: Conservation Breeding Specialist Group [SSC/IUCN]/CBSG Mesoamerica, March 5-6, 2014).

Reptiles of Costa Rica

A FIELD GUIDE

TWAN LEENDERS

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For my dad, Martien Leenders,
whose infectious love of the outdoors
started me on the inspiring journey
that led to this book. Bedankt pap!

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Foreword

Although literacy is the cornerstone on which all modern societies are built, we seem to have curiously lost the ability to "read" nature. Identifying an organism and knowing what it does, where it lives, and how it interacts with the rest of the world makes it relevant to us and, hopefully, instills in us the importance of our stewardship of the natural world. Field guides, in part, are a tool for relearning how to read the natural world.

Venture into any tropical forest in Costa Rica and you will undoubtedly encounter reptiles as soon as you enter. Perhaps, on a given day, you might spot two charismatic anoles showing off their colorful dewlaps. In this instance, this new book by Twan Leenders would help you distinguish among the 38 anole species in the country and provide insights into their biology and natural history. The detailed range maps alone assist in making a proper identification. *Reptiles of Costa Rica* allows you to identify all 245 species of reptile currently recognized in the country, and who wouldn't want to know what kind of snake has just crossed one's path?

Written for herpetologists and novices alike—and published in a compact, portable format—this is an essential field guide to use as you explore the country. I am old enough to recall a time when there were no field guides to either the reptiles or amphibians of Costa Rica. In the early 2000s, we biology students had to rely on a dichotomous key devoid of images to identify these animals. But this was often not enough. Experience and access to museum specimens were crucial for successfully identifying many groups of reptiles. The process was frustrating and there were few people in the country who were experts on the taxonomy of Costa Rican reptiles.

On past research trips to Costa Rica, I would haul out Jay Savage's encyclopaedic, and extremely heavy, tome *The Amphibians and Reptiles of Costa Rica: A Herpetofauna between Two Continents, between Two Seas*. To make it easier to carry, I eventually ended up ripping out the plates of one copy and would just take those and some identification keys into the field with me. But now, I'll carry *Reptiles of Costa Rica* with me to help with species identification, but also as a class resource when I am out teaching herpetology and conservation biology classes. In fact, I will soon be taking four of my students out into the field to collect data for their dissertations and I have required them to get copies and keep them with them at all times!

This new field guide is not only comprehensive and easy to use, it is also up to date and has magnificent pictures. Chock full of natural history information, it contains wonderfully annotated images, one of my favorite features of the book. This guide is an essential tool in an endeavour that has a greater purpose, which is to account for Costa Rica's biodiversity, in its entirety, and to conserve it for future generations.

Dr. Rob Puschendorf
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I would like to thank the hundreds of students who shared their passion for biology with me over the past 25 years, and who have helped me find and study a wide variety of reptiles and amphibians. The community of photographers who participate in the "Meet Your Neighbors" global biodiversity project and who often share their gorgeous white-background photographs with the world has been a real inspiration. Thanks also go to my colleagues at the Roger Tory Peterson Institute of Natural History, who understand more than most how field guides can inspire people to appreciate the natural world around them. And, of course, there are my friends and family who have joined me at various points on this long journey. Without them I would not have been able to complete this work.

There are simply too many people behind this book to list them all. Some deserve special recognition, however, for their extraordinary help. My wife Casey and kids Madeleine and Jason have suffered through several book projects in recent years, and it never gets easier. My travels have often taken me away from home for weeks on end, and the time it takes to put these books together is generally measured in lost family time. I have said this before, but they have as much invested in my books as do I, and I am deeply grateful for their love, support, and understanding of what makes me tick.

Much appreciation also goes to my friends Alex Shepack, Tim Paine, and Sean Graesser, with whom I have shared many unforgettable times in the field over the years. Others who have generously contributed time, effort, and knowledge—and whose insights have contributed greatly to this book—include César Barrio-Amorós, Jaime Culebras, Michael Fogden, Roel de Plecker, Cristian Porras Ramirez, Rob Puschendorf, Greg Watkins-Colwell, and Wendy Welshans. Special thanks go to Quetzal Dwyer, who is always quick to share his unrivaled knowledge of the reptiles of Costa Rica and who, on many occasions, has allowed me to photograph animals from his amazing collection at Parque Reptilandia.

Marshal Case and the Trust for Wildlife have supported my tropical conservation research and facilitated student participation in past years. Their invaluable help has contributed to the success of recent field work.

Many people have generously contributed photographs to this book. A complete list of all photographers and the images they provided can be found on page 617. Jaime Culebras, Stephane De Greef, Sean Graesser, Ray Morgan, Piotr Naskrecki, Cristian Porras Ramirez, Alex Shepack, Kevin Venegas Barrantes, and especially Roel de Plecker went out of their way to secure specific images for me; and José Martínez-Fonseca and Sebastian Lotzkat were especially generous in letting me use large numbers of their photographs. Instituto Clodomiro Picado generously allowed Jaime Culebras to photograph venomous snakes from its collection. Don Miguel Solano and Norberto Solano were of great help to Cristian Porras Ramírez in securing photographs.

Once again, it was John McCuen, of Hellbender Publishing and Zona Tropical Publications, who managed to somehow, miraculously, keep me and this project on track long enough to create the book you are now holding.

Thank you all!
Twan Leenders

Introduction

Costa Rica is home to no fewer than 245 species of reptile. These fascinating, beautiful animals are extremely diverse, both in morphology and biology. Despite their beauty and intriguing natural history, reptiles are often vilified, in part due to a lack of knowledge about them. Certainly, dangerous species of reptile do exist, but the vast majority of these animals are entirely harmless. Even those species that could be a potential threat to humans generally provide incalculable beneficial services to the ecosystem and—directly or indirectly—to us. Just consider the staggering number of rodents a snake consumes during its life and the amount of crop damage it therefore minimizes—and the number of disease vectors it prevents from spreading pathogens.

Reptiles of Costa Rica is intended to help readers identify the country's crocodilians, turtles, lizards, and snakes, and to provide information about the natural history of these animals. The author also hopes that increasing the reader's understanding of and appreciation for the country's reptiles will spur conservation efforts.

Because this is a field guide, a reference book designed to travel in the reader's pocket or backpack, it has been important to balance the need to keep the book portable with the desire to provide as much information as possible on the country's 2 crocodilians, 5 marine turtles, 9 freshwater turtles, 88 lizards, and 141 snakes. Each species account provides a synopsis description of the animal; information on distribution (within Costa Rica and other countries), along with a range map and an ecoregion bar that indicates the habitats in which each species occurs; natural history information; a description of the conservation status of the species; key characteristics, with accompanying photographs; and a description of similar species that might cause confusion in the field.

Geography, Climate, and Weather

Costa Rica is a small country of roughly 19,730 square miles (51,100 km²). Its Atlantic and Pacific coasts are separated by four mountain chains (called *cordilleras* in Spanish) that run roughly in a northwest to southeast direction: the Guanacaste, Tilarán, Central, and Talamanca mountain ranges. These mountains include one of the highest peaks in Central America, Cerro Chirripó (12,530 ft / 3820 m), and several active volcanoes. The Central Valley, where the majority of Costa Ricans live, is a large highland valley enclosed on all sides by the mountains of the Central Mountain Range and the northern part of the Talamanca Mountain Range. The Atlantic side of the country consists mainly of a large, flat coastal plain that is widest near the Nicaraguan border and narrows toward the southern border with Panama. The Pacific side of the country can be divided into two climate regions: the dry northern region, which encompasses the lowland plains of Guanacaste and the Nicoya Peninsula, and the wet Osa Peninsula and adjacent lowlands in the south.

Costa Rica lies within the tropics and is about halfway between the Tropic of Cancer and the equator. At any given place in the country, the average temperature in the hottest month of the year does not exceed the average temperature in the coolest month by more than 9 °F (5 °C). This small variance is strikingly different from the large changes in temperature that can occur locally on a daily basis. In some areas it is invariably hot during the day, but can turn cool at night. With temperatures relatively

constant, seasons in the tropics are not defined by temperature differences but rather by variation in rainfall.

All of Costa Rica experiences a dry season and a rainy season each year, but the duration and timing of each vary significantly depending on the region. Generally, the dry season begins toward the end of November or early December and lasts until April or May, when the rainy season begins. However, there is a marked difference in the amount of rainfall received by the Pacific and Atlantic slopes. The Pacific slope has an average annual precipitation of around 98 in (2500 mm), while the Atlantic foothills may receive more than twice as much. Note that even in the dry season it is not uncommon to see daily precipitation in many parts of the country, particularly on the Atlantic slope. Another well-known phenomenon is the occurrence of a *veranillo*, or little summer, a short dry spell during the rainy season that lasts a few weeks and usually takes places in July or August. This regional variation in seasonality is the reason why the timing of the dry and wet season indicated in different species accounts varies depending on where it occurs.

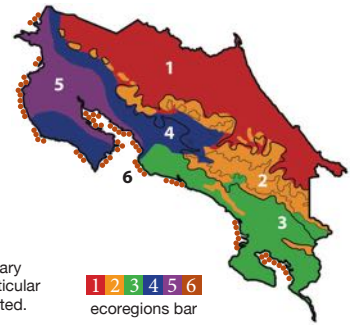
The northwestern part of Costa Rica, north of the Tarcoles River and including the Nicoya Peninsula, is very hot, and substantially drier than the rest of the country. Annual precipitation there ranges from 51 to 91 in (1300 to 2300 mm). The forest in this part of the country has a low canopy, with trees usually less than 49 ft (15 m) tall. The trees generally lose their leaves during the dry season, which is particularly harsh and may last up to eight months, starting around October. Towards the end of this prolonged dry season, reptile density and diversity tends to decrease significantly as many of these animals retreat underground into burrows during periods of extreme drought. In some cases, normally diurnal species may switch their activity temporarily to the nighttime to escape the greatest heat.

The highest density and diversity of reptiles is found in wet lowland areas, especially along the Atlantic coast and in the area on, and surrounding, the Osa Peninsula on the southern Pacific coast. In most of these evergreen forests, it rains almost year-round, and some areas may receive more than 236 in (6000 mm) of rain annually. In most of the remaining lowland areas, the rainfall is much less extreme, with 98 to 157 in (2500 to 4000 mm) of rain per year.

At elevations above roughly 4900 ft (1500 m), a cooler climate prevails, with temperatures from 50–61 °F (10–16 °C). Near the summit of some of the higher peaks, at elevations above 11,500 ft (3500 m), there is sometimes frost. The prevailing weather and climate conditions at high elevations are generally not conducive to reptile activity, and many species have limited surface activity during periods of cold, wet weather; highland reptiles can therefore be very difficult to find. Whereas the lowland regions are home to the greatest number of species and individuals, the highlands, above roughly 4900 ft (1500 m), are home to more elusive, and often endemic, species. Many of Costa Rica's endemic species are restricted to one or a few mountains, isolated from neighboring mountains by intolerably hot and/or dry lowlands.

Ecoregions

Costa Rica's widely varied landscape can be subdivided into several ecoregions, each defined by specific environmental conditions and the assemblage of species they contain. Seven such ecoregions are formally recognized on the Costa Rican mainland, while Cocos Island's Moist Forest ecoregion (located in the Pacific Ocean, approximately 340 mi [550 km] from the mainland) constitutes the eighth.



Each species account has an ecoregion bar that indicates the primary ecozones where a particular species is to be expected.

Six of the country's ecoregions provide critical habitat and ecological resources for the reptile species described here. The geographic distribution range of many reptiles in Costa Rica is defined by the same environmental parameters that help define these ecoregions. Therefore, each distribution map in this book is accompanied by an ecoregion bar that indicates the numerical code of the ecoregion/s where a given species is most likely encountered. Although some marine turtles, and possibly the American crocodile (*Crocodylus acutus*), may occasionally enter the Atlantic coast mangrove, the seventh recognized ecoregion on Costa Rica's mainland, none of the country's reptiles relies exclusively on this habitat type, and it is therefore not included in the ecoregion bars included in each species account.

In the case of the two Cocos Island endemics (*Sphaerodactylus pacificus* and *Anolis townsendi*), their occurrence on this remote island is indicated separately on the ecoregion map.

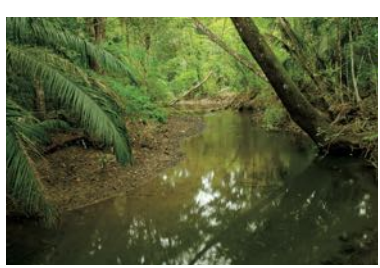
Note that the five species of marine turtle, as well as the yellow-bellied seasnake (*Hydrophis platurus*), are true marine animals that only come on land to nest (in the case of marine turtles) or inadvertently wash ashore (in the case of the seasnake). Therefore, these species are not assigned to specific ecoregions, as the ecoregions pertain to terrestrial habitats only.

1. Isthmian-Atlantic Moist Forests. This ecoregion spans the Atlantic lowlands and foothills of Nicaragua, Costa Rica, and Panama. Most reptiles that are endemic to this assemblage occur below 1640 ft (500 m). This ecoregion represents the archetypical wet, evergreen tropical forest most people conjure up when imagining what a rainforest looks like. It is a hot and humid environment with tall trees, a closed canopy, and dense understory vegetation. Much of this ecoregion has been severely affected by logging, agriculture, and fragmentation; remaining large blocks of pristine habitat now only exist in protected areas such as Barro del Colorado Wildlife Refuge, Tortuguero National Park, Gandoca Manzanillo Wildlife Refuge, and the lower reaches of Braullio Carrillo National Park.

2. Talamancan Montane Forests. This ecoregion is confined to the highlands of Costa Rica and western Panama, and is characterized by relatively cool temperatures and high levels of rainfall. Locally, habitats and species unique to this ecoregion can be found as low as 2460 ft (750 m), but generally this assemblage occupies higher elevations, ranging from roughly 4925 ft (1500 m) to the summits of the highest peaks in Costa Rica. It includes habitats such as cloud forest, pine-oak forest, and, above the tree line, high elevation páramo. Many sections of this ecoregion are protected in national parks and other preserves in the Central Mountain Range (e.g., Poás National Park and Irazú National Park) and the Talamanca Mountain Range, which includes Chirripó and Tapantí national parks and La Amistad International Park, a World Heritage Site in southern Costa Rica and western Panama.

3. Isthmian-Pacific Moist Forests. Occupies the Pacific lowlands and foothills of southern Costa Rica and Panama, primarily below 1640 ft (500 m) but also extending into the foothills, where some overlap with ecoregions 2 and 4 may occur. This ecoregion is characterized by tropical evergreen forest habitats, warm average temperatures, and relatively high amounts of rainfall. It is similar to ecoregion 1 in the overall appearance of its prevailing habitat, although Pacific slope evergreen forests often have a higher diversity of palms. The geological history of this region, and its relative isolation because of the dry ecoregions bordering to the north and high mountains to the east, have led to a high level of endemism. Logging and development have caused significant loss of the original forest cover in this ecoregion, and habitat remnants of any size are currently restricted to protected areas such as Corcovado National Park, Manuel Antonio National Park, and Piedras Blancas National Park.

4. Costa Rican Seasonal Moist Forests. This ecoregion is located on the Pacific slope of Costa Rica and Nicaragua, and is characterized by a distinct seasonality. Its dry season is less intense and shorter than that in the nearby dry forests (ecoregion 5), and the cooling influence from the Central and Tilarán mountain ranges, which form the ecoregion's eastern border, provide seasonal increases in moisture levels. The forest types in this region are primarily deciduous; typically, many trees drop their leaves during the dry season. This ecoregion includes much of the



Central Valley, foothills of the Pacific northwest, as well as the higher elevation forests on the southern end of the Nicoya Peninsula. It includes Rincón de la Vieja National Park, Cabo Blanco National Park, and the Guanacaste Conservation Area.

5. Central American Dry Forests. Extends along the Pacific coast from southern Mexico to northwestern Costa Rica. This ecoregion is highly fragmented and few relatively undisturbed areas of dry forest remain; it is one of the most endangered ecosystems in Latin America. Dry forests typically experience a prolonged dry season that may last from five to eight months. The habitat is often characterized by relatively low trees, thorny scrub, and plants like cacti and agave that are adapted to arid conditions. Many of the species that inhabit this area are unique to it. Santa Rosa National Park is a notable example of this ecoregion.

6. Southern Mesoamerican Pacific Mangroves. This ecoregion contains two types of mangrove within Costa Rica. The Southern Dry Pacific Coast Mangrove region occupies the coastal zone of Guanacaste Province and the Nicoya Peninsula, including the Golfo de Nicoya. It transitions into the Moist Pacific Coast Mangrove region, which runs roughly from the town of Jaco southward and includes the Osa Peninsula and the shores of the Golfo Dulce. This ecoregion is characterized by salt-tolerant tree types (mangroves) that grow in the many sheltered coves and bays along the Pacific coast. These forest types often rely on a significant influx of fresh water, as the mangroves occupy river deltas and streams that drain into the Pacific Ocean. Corcovado National Park, Tamarindo, and the Golfo de Nicoya likely protect the largest swaths of this habitat type, but additional, smaller patches occur locally along the southern Pacific coast as well as in the northwest, near the Nicaraguan border.

Classification and Scientific Names

Reptiles are vertebrates that all share key characteristics derived from a common evolutionary ancestor. One of the most prominent features that defines a reptile is the presence of dry, scale-covered skin. Other vertebrate animals with scale-covered skin include bony fish and cartilaginous fish, but those animals are aquatic, lack shoulder and pelvic girdles and associated limbs, and breathe using gills rather than lungs. All reptiles are considered terrestrial tetrapods (having four limbs), even though some reptile species are adapted to an entirely aquatic lifestyle (e.g., marine turtles and seasnakes). While a large number of reptiles do not have four limbs, they are still considered tetrapods because they descend from reptilian ancestors who once did have such features.

Gonatodes albogularis is a common lowland lizard, often seen on palms, strangler figs, or other trees with deeply creviced bark.

Adaptation to specific environmental conditions or habitats has led, over evolutionary time, to dramatic changes in the external morphology of many contemporary reptiles. Loss of limbs is a striking example of natural selection in reptiles, as is the evolution of the unique shell and skeletal morphology seen in modern-day turtles.

All reptiles lack the ability to generate body heat internally and rely on external sources of heat to increase their body temperature. They are not necessarily "cold-blooded," as is often stated, because the internal body temperature of an active desert lizard may far exceed the body temperature of a "warm-blooded" animal such as a mammal or bird. Reptiles simply lack a consistent internal body temperature that is fueled by their metabolism. Instead, their active internal temperature responds to fluctuations in their external environment. A low ambient temperature during winter months, seasonal cold spells, or even at night after the sun goes down, generally results in decreased activity in reptiles, although many species have adopted strategies that allow them to remain active at night in tropical environments. In temperate climate zones, many reptile species go dormant or even hibernate during periods of inhospitably cold temperatures. Similar patterns can be seen in tropical climates, particularly at high elevations, with lower prevailing ambient temperatures; at any elevation, periods of increased cloud cover or rainfall may suppress reptile surface activity temporarily. Conversely, during extended periods of hot, sunny weather in lowland habitats, reptile surface activity may be suppressed because temperatures are too high. Some reptile species adjust to hot weather by shifting their activity to the nighttime or their movements to subterranean burrows.

Reptiles are also unique in that they deposit their leathery-shelled eggs away from water (amphibians lay gelatinous eggs, which lack a shell, in water). Some types of reptiles produce relatively hard-shelled eggs, reminiscent of bird eggs, while other species are ovoviviparous. The young of such species tend to incubate inside a membrane-like egg inside the female's body, and hatch right before, or immediately

upon, parturition. Such species thus generate the impression that they are live-bearing, though embryonic development actually takes place inside the egg.

Modern-day reptiles that share the traits described above include tuataras, turtles, crocodilians, amphisbaenians, lizards, and snakes. It may not come as much of a surprise to learn that the phylogeny (evolutionary history) of the reptile clade includes many now extinct forms that are commonly referred to as dinosaurs. Another fact about reptile phylogeny, one perhaps harder to accept for the general public, is that birds are also direct descendants of the ancestral clade that forms contemporary reptiles. Birds share many traits seen in reptiles. They are terrestrial tetrapods with very similar morphological features. While their scales have evolved into feathers on much of the body, the scales on bird legs are virtually identical to reptilian scales. Their feathers provide insulation to retain body heat, which is generated internally (the biggest difference between birds and reptiles), but both groups reproduce using hard-shelled eggs. Many other morphological and behavioral features are shared between birds and reptiles, and the current understanding is that birds are a phylogenetic sister group to archosaurs, represented today by the crocodilians. Adaptations that are shared between birds and crocodilians, but not necessarily between crocodilians and other reptiles, include several behavioral traits, including the fact that both groups build a nest to lay their eggs in, and the fact that both groups vocalize during territorial and courtship interactions. Advanced parental care is seen in both birds and crocodilians.

The current count of living reptile species (not including birds) numbers just shy of 11,000, divided over four main orders. The order Rhynchocephalia contains a single, lizardlike reptile, the tuatara (*Sphenodon punctatus*). This living fossil is only found on a few small islands off the coast of New Zealand and represents the last surviving member of an ancient lineage. Approximately 335 species of turtle comprise the order Testudines, characterized by their unique skeletal modifications that form a shell and their toothless jaws. The order Crocodylia includes 24 species of crocodiles, alligators, caimans, and the unique Indian gharial. The vast majority of contemporary reptile species, well over 10,000 species, is currently placed in the order Squamata, which includes all lizards, snakes, and a relatively small number of limbless, lizard-like reptiles called amphisbaenians, none of which occur in Costa Rica.

Taxonomy and phylogeny, the branches of biology concerned with the naming and classification of living things, offer the framework we use to categorize and discuss individual species, as well as identify the evolutionary groupings into which each species seems to fit best. Historically, classification has been based primarily on morphological traits and the shared characteristics that groups of species inherited from a common ancestor. The classification of taxonomic ranks below the order level is fairly well established for the smaller reptile orders and other groups, based on morphological features. Nevertheless, the family rankings of several turtles and other groups have seen significant changes in recent decades. Given that there are more than 10,000 species in the order Squamata, and that many of these species (particularly snakes) show only very limited variation within their general morphology, assigning these species to meaningful families or other taxonomic ranks based on external morphology alone has proven challenging. In the past decades, analysis of molecular-level characteristics such as DNA sequences has provided a parallel system of classification that can be applied in conjunction with comparative anatomy to better organize the known reptiles. Broad application of such techniques on some of the more complex groups of reptiles continues to spur major reclassification efforts across many reptile families, genera, and species. In addition, many recently described lizard species are primarily identified based on differences in their reproductive organs, the assumption being that such

physical differences likely create reproductive isolation, a common basis for speciation. However, ecological data to back up these assumptions is generally not available and the validity of many cryptic species—those that are indistinguishable based on external morphology—is often questioned. Clearly, much more information is needed to adequately understand even the fundamentals of reptile phylogeny. Recent years have seen many attempts at clarifying the reptile phylogenetic tree and many sections have been reviewed and redrawn based on different data sets. It is understood that this is an imperfect process, only as good as the data it is based on, and future changes are expected as new information becomes available. Given that taxonomic decisions are inevitably based on incomplete information, a good deal of interpretation is involved, and it is possible for two experts who agree on classification criteria to disagree on the specific phylogenetic placement of organisms, or groups of organisms.

Needless to say, the taxonomic organization presented here will likely change over time. This will obviously also impact the number of species allocated to the reptile fauna of Costa Rica.

Each formally described species is given a unique, binomial scientific name that consists of a genus and species label, a system that traces back to the nested hierarchical classification system implemented by Linnaeus in the mid-1700s. A genus forms the hierarchical level above a species. Multiple genera usually form a family, multiple families are contained within an order, and the three orders contained in this book (crocodilia, turtles, and squamates) together comprise the class reptilia. Given the large size of the order Squamata, Costa Rican species are divided over two suborders, Lacertilia (lizards) and Serpentes (snakes), but even within those suborders other overarching groupings (infraorders) are recognized to lump together similar families.

The unique genus-species label is indispensable for communication in scientific circles but admittedly can be awkward for the nonspecialist. Common names are not formally recognized—at least not in the case of tropical reptiles. Several well-known Costa Rican reptile species have commonly used vernacular names associated with them, but most do not. For this book, an attempt was made to provide a common name for most species in the hope that they will eventually become established.

Observing and Identifying Reptiles

There are reptiles virtually everywhere in Costa Rica, but not all of them are easy to observe. And, as is generally the case in tropical environments, there exist few common species and many rare ones. Species that are commonly seen tend to be adaptable and can survive in a variety of habitats, including those shared with humans. In general, lizards tend to occur in higher densities than do snakes, while turtles and crocodilians are much rarer, and often confined to specific habitats or geographic regions. Some of the more common (and most commonly seen) lizards in the country include the non-native house geckos (genus *Hemidactylus*) that in recent decades have literally taken up residence in homes and other buildings throughout most of the country. These nocturnal lizards are abundant on walls and in the rafters of many buildings and usually gather near light fixture at night, where they catch the insects that are attracted by the light. Their short, barking calls are a common nighttime sound in the lowlands of both slopes, as well as in many parts of the Central Valley. Even in urban areas, you can find a number of other reptile species. Green spiny lizards (*Sceloporus malachiticus*) occur in downtown San José, and several anole species are commonly found in the city's yards and

parks. A wide variety of snakes inhabits those same areas, as well as abandoned, overgrown lots throughout the Central Valley, though encounters with them are not common. Perhaps surprisingly, coralsnakes (*Micrurus nigrocinctus*) are found even in densely developed areas. Villages and towns in coastal areas can harbor some very spectacular reptiles in close proximity to humans, and even in broad daylight you can spot enormous green iguanas (*Iguana iguana*) and spiny-tailed iguanas (*Ctenosaura similis*) in trees, on roofs, or on fence posts. Basilisks (*Basiliscus* spp.) will dart alongside and across the surface of creeks and small rivers, and sometimes freshwater turtles, or even caimans, can be seen basking on logs or sandbars. Tiny yellow-headed-geckos (*Gonatodes albogularis*) often dart in and out of the crevices in the trunks of palm trees and strangler fig trees, while a variety of anole lizards inhabits the vegetation between homes and along roadsides.

When visiting natural areas in search of reptiles, a few things are worth noting. In general, it is the movement of a fleeing snake or lizard that will alert most observers to their presence, but in most of those cases you'll only see their tail end disappear into the underbrush, or down a hole. The trick is to look just a little farther ahead than you would normally do when hiking and to spot these reptiles before they flee. Many species rely on their cryptic coloration to escape detection and will often freeze in place when spotted, rapidly fleeing if approached too closely. Being able to extend your field of view just a little beyond where you would normally look can help you locate lizards and snakes before they disappear. Some types of lizards, especially iguanids and anoles, often scurry to the side of a branch or tree trunk opposite to where you are standing. You can walk up to the tree in question and peek around its trunk to see the lizard. Since snakes can sense the vibration generated by the footsteps of an approaching hiker, walking slowly and treading lightly seems to help keep some species from escaping well in advance of your arrival. Note that virtually all snakes will try to get out of a human's path quickly and quietly; any snake that remains coiled in front

Venomous snakes, like this eyelash palm-pitviper (*Bothriechis schlegelii*), are well camouflaged and easy to miss in areas with dense vegetation.

of you as you approach it should be treated as potentially dangerous, as in many cases it is a pitviper waiting in ambush.

It is recommended that you look for reptiles on night hikes in forested areas. Not only is it possible to see night-active species, but, given the appropriate weather conditions, one can also find day-active lizards and snakes sleeping on the vegetation. Look for sleeping anoles on the thinnest twigs and on top of leaves, anywhere from a foot above the ground to several yards up. If you are fortunate, you may be able to spot blunt-headed vine-snakes (*Imantodes* spp.) hunting for these lizards. Many day-active snakes, such as members of the genera *Dendrophidion*, *Leptophis*, *Mastigodryas*, *Oxybelis*, or *Phrynonax*, commonly sleep coiled on vegetation several yards above the ground. These fast-moving species can be hard to get a good look at during the day, but are easily admired while they sleep. If it is not raining at dusk, when these animals seek a place to sleep, than there is a good chance that a night hike might be productive. However, if it is raining hard at dusk, then these species are more likely to sleep in a more sheltered spot, rather than exposed on top of vegetation, and will likely not be out at night. Another factor that influences the visibility of sleeping reptiles at night is the lunar phase; generally, when the night is brightly lit by the moon, there will be few reptiles sleeping in exposed locations, likely because of the increased risk of predation.

One of the best ways to find reptiles in cold montane areas, where their surface activity is often limited to periods of warm, dry weather, is to look under logs, boards, or other surface debris. Boards and other flat pieces of wood with a dark color and rough surface texture provide a perfect hiding place, one that warms up readily when the sun comes out and provides convenient radiant heat to any reptile hiding underneath it. It is very important to always keep in mind that dangerously venomous snakes, as well as other unpleasant surprises (e.g., scorpions and wasps) may await underneath such cover objects and one should never place one's fingers underneath a board or other object without first checking to see what is there.

Snakebites and Prevention

Costa Rica is home to several venomous snakes and it is not always easy to distinguish between a venomous and non-venomous species in the field. In fact, there are many harmless snakes that are very similar in appearance to truly dangerous ones, and it is easy to mistake the two.

Although snakebite incidents are not uncommon in Costa Rica (500–1,000 bites are reported annually), fatalities are rare. This is in part due to the fact that the treatment of snakebites has become increasingly effective; the number of people that die after being bitten by a venomous snake has decreased dramatically in the last 50 years. At present, the mortality rate due to snakebite in this country is estimated to be approximately 0.2 per 100,000 inhabitants, almost 25 times lower than in the early 1950s. While the chances of surviving a bite by a Costa Rican venomous snake are good, there remains the danger of incurring permanent damage from the effects of the venom, and a bite from a pitviper, coralsnake, or seasnake should always be regarded as very dangerous.

In Costa Rica, the highest snakebite incidence rates occur in the Atlantic and southern Pacific lowlands, near sea level. In the northern Pacific lowlands, the most dangerous venomous snake in the country, *Bothrops asper*, is not very common. Areas that were formerly covered with rainforest and that are now transformed into agricultural fields appear to be the most risky places, and many of the snakebite

victims in Costa Rica are people who work those fields on a daily basis. The risk of being bitten by a dangerously venomous snake while visiting Costa Rica is very slim, but you should be cautious given the risks. Here are a few simple rules that can help further decrease your chances of being bitten.

- When encountering a dangerously venomous snake, remain at a safe distance. No venomous snake in Costa Rica is capable of striking much more than half its body length. As a general rule, a "safe distance" with such reptiles is at least one full snake body length away from the animal.

- Never handle a venomous snake, not even when it appears dead! Many snakebite accidents happen during handling or when attempting to pick up a venomous snake. In fact, most coralsnake (*Micrurus*) bites occur when these snakes are picked up in the mistaken belief that they are harmless. Some snakes "play dead" when they feel threatened but may suddenly come alive again when touched. Even truly dead snakes can be dangerous because of muscle reflexes that may occur up to several hours after the snake's death. A famous example of such reflex action is known from the US, where a man died after being bitten and envenomated by the severed head of a rattlesnake!

- In Costa Rica, most bites occur on feet and lower legs, when snakes are inadvertently stepped on. Pitvipers are very well camouflaged. Even very large snakes are sometimes hard to see under the low light conditions that prevail in a forest interior. Note that throughout the country venomous snakes can also be expected on vegetation and rocks, not just on the ground.

- Common sense will protect you from most bites by unseen snakes; follow the general rule of "look before you grab and look before you step," and the chances of encountering an unpleasant surprise will be greatly reduced.

Coralsnakes (genus *Micrurus*) and the yellow-bellied seasnake (*Hydrophis platurus*) have relatively short fangs, and the chance of receiving a bite when not handling one is negligible. Large individuals of species such as the fer-de-lance (*Bothrops asper*) have very long fangs, up to 1 in (25 mm) in length, and such large snakes are capable of injecting venom through pants and above boots. However, wearing sturdy shoes or boots and long, loose-fitting pants will protect anyone from a bite from all but the largest terrestrial pitvipers.

When walking at night, always use a flashlight to illuminate the path you are walking on. Snakes reflect light well at night, and are easily seen in the beam of a strong flashlight.

How to Respond to a Venomous Snakebite

The current general consensus is that traditional treatments such as incision and suction, or applying tourniquets, electric shocks, or ice on or near the bite site are often ineffective and may even have injurious effects on the victim.

Rapid evacuation of the patient to a medical facility should always have priority over first-aid measures, but the following steps should be taken:

- Remain calm or reassure the victim. Many people believe that after being bitten by a venomous snake, death will come fast and inevitably. However, medical treatment is available in all hospitals and many clinics in Costa Rica, and is effective in most cases.

- Immediately remove rings, bracelets, and tight-fitting clothes before swelling commences.

- Immobilize the bitten body part, if necessary with a splint, and place a bitten extremity below heart level. In the case of a coralsnake bite, it is advisable to lay the patient on his or her side with the head bent back, to avoid obstruction of the airway caused by paralysis of the tongue.

- Avoid alcohol, coffee, and aspirin. All these substances may cause increased bleeding and a higher heart rate.

- Do not apply tourniquets or constriction bands. Such devices may rapidly cause unbearable pain, and their application has resulted in the loss of limbs in several cases.

- So-called extractor-kits have been known to remove some venom in laboratory tests. Although they remain to be proven effective under field conditions and in humans, they are not likely to do any harm and may be of some use. Extractor kits that utilize cutting and/or constriction bands should never be used.

- If a patient goes into shock before reaching a hospital, give him or her oxygen, if available. In the case of envenomation by a coralsnake, respiratory arrest may occur. If necessary, apply standard cardiopulmonary resuscitation (CPR).

Don't attempt to bring the biting snake to the medical facility. A polyvalent anti-Crotalinae serum, which is active against the venom of all Costa Rican pitvipers, and a serum against the venom of different coralsnakes is produced by Instituto Clodomiro Picado in Costa Rica. It is not necessary to know exactly which species of venomous snake caused the bite incident to receive proper treatment, although a photograph of the snake may help speed up treatment.

How to Use This Book

As much as possible, the identification clues given in this book are meant to be observable from a safe distance and one should not attempt to catch any snake for the sake of identifying it. Rather, observe it in its natural habitat, take a picture, and try to identify it based on the photo. Even though there are no dangerous lizards in Costa Rica, handling these animals is also not recommended. Many species can drop their tail in defense and, even though it will eventually grow back, it will still disadvantage the animal for the time it takes to regenerate it. Geckos have very thin, delicate skin that can tear off even with gentle handling. If the need arises to look at a lizard more closely, it can be placed in a transparent plastic bag (resealable freezer or sandwich bags work very well) and easily observed without continuing to handle it.

When using this book to identify a reptile, start of course at the appropriate order/suborder section (crocodilian, turtle, lizard, or snake), and rely on the information in the introductory sections to guide you along until you reach the appropriate family. Carefully read the descriptions for each species in a given family, and check against possible sources of confusion in the "Similar species" list at the bottom of each account. Every effort has been made to address variation within species (between males and females or between juveniles and adults), which can further complicate identification, but the reality of the matter is that, as indicated earlier, some of these species simply cannot be reliably identified based on morphological features alone. Hopefully, this inconvenience will not distract observers from carefully studying Costa Rica's fascinating reptiles, and learning more about not just their identity but also about their biology, as so many aspects of these animals' lives are still largely unknown.

Dinosaur-like spiny-tailed iguanas (*Ctenosaura similis*) are a common sight along much of the southern Pacific coast, even within villages.

Crocodilians
(Order Crocodylia)

Worldwide there are 24 species of crocodilian, divided among 3 families: alligators and caimans (family Alligatoridae), crocodiles (family Crocodylidae), and the unique gharial (family Gavialidae), whose sole member occurs in the Ganges River, India. There are 9 species in the family Alligatoridae, divided over 5 genera; the widespread spectacled caiman (*Caiman crocodilus*) is commonly found in Costa Rica. The family Crocodylidae contains 14 species, in 3 genera; 1 species, the American crocodile (*Crocodylus acutus*), occurs in Costa Rica.

As a group, crocodilians are easily recognizable. All have a muscular, laterally compressed tail that is used to produce the main thrust during swimming. A large, flattened head with elevated eyes and nostrils allows crocodilians to breathe and see even when the body is submerged. Their ears and nostrils are equipped with a moveable flap that closes off these body openings when the animal dives. Also, crocodilians have a secondary palate that separates the airways from the interior of the mouth; as long as their nostrils are above water, they can breathe even when the mouth is open below the surface, a very useful feature when handling large prey in the water. Although highly adapted to an aquatic life, most species are often surprisingly agile on land. Crocodilians have powerful limbs and raise their body off the ground when running. They are the only reptiles with four toes

on their hind limbs and five digits on the front limbs; their feet are extensively webbed, while the hands lack webbing.

All crocodilians lay eggs, either in a moundlike nest that they construct from vegetation and soil, or in a burrow excavated in the bank of a lake or river. Mating takes place shortly before egg-laying. During the mating season, some male crocodilians entice females to mate with them by raising their head out of the water, opening their mouth, and producing long, resounding roars that sound somewhat like the beating of a large drum. If a female enters the territory of a sexually active male, he performs an impressive courtship display in which he roars loudly and slaps the water surface with his head and tail. If the female is receptive to his advances, the pair swims away, and the male grabs hold of the female with his legs. Copulation invariably takes place in the water.

During the development of the eggs, the female guards the nest and defends it against intruders. When the young are ready to hatch, the female opens up the nest to enable them to leave. In some species, the young start calling while still inside the egg to signal to their mother that the moment of hatching has arrived; hearing and the sense of smell are very well developed in crocodilians. Females of some species even participate in freeing their offspring from the egg, then gently pick up the baby crocodile with their mouth to carry it to the water.

In some areas in Costa Rica, such as the Tárcoles River, American crocodiles (*Crocodylus acutus*) occur in extremely high densities. Many years of legal protection have allowed these animals to grow to impressive sizes. Visitors to any lowland river system, estuary, or coastal area should be aware that crocodiles may be present.

Crocodilians are one of two surviving groups of archosaurs, an ancient group of prehistoric animals that includes many extinct dinosaurs as well as birds. As a group, archosaurs share many synapomorphies, similar traits inherited from a common ancestor. Even though crocodilians and birds are clearly very different animals, it is interesting to think about some of the behavioral commonalities these groups share, including the ability to produce vocalizations during territorial and courtship behavior, the fact that members of both groups create nests and lay hard-shelled eggs, and the quite involved parental care behavior that both birds and crocodilians display.

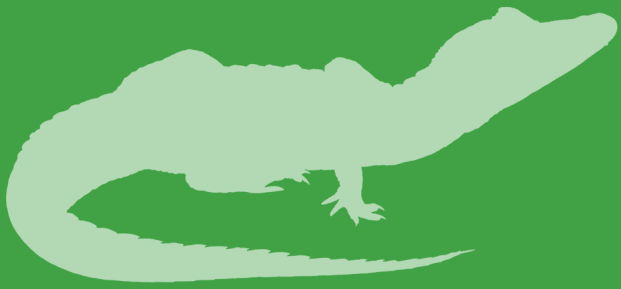
Crocodilians live in tropical countries throughout the world, although some species range into subtropical regions. With some notable exceptions, these aquatic carnivores are restricted to freshwater habitats, where they are at the top of the food chain and feed on a wide variety of animal prey. Small prey is swallowed whole, while large prey is sometimes held underwater until drowned, after which it is stored underwater for later consumption. Crocodilians have numerous sharp but somewhat peglike teeth that lack cutting edges. They are not useful for chewing or biting off pieces of flesh. Instead, crocodilians catch their prey and hold it as they rotate fiercely around the axis of the body (the infamous "death roll") in order to tear off flesh. Since their heavy bodies are more agile when supported by water, crocodilians generally eat large prey in the water. The diet of the Central American crocodilians mainly consists of small prey.

Crocodilians are endangered worldwide. Extensive habitat loss and overexploitation, mainly for their meat and hides, have brought several species to the brink of extinction. Historically, Costa Rican crocodilians were hunted relentlessly, and their numbers were dramatically reduced.

People all over the world fear them as ferocious man-eaters. Their thick, scaly body armor, their powerful jaws, and their vertically slit pupils do indeed present a threatening appearance. Only two species, however, the African Nile crocodile, *Crocodylus niloticus*, and the saltwater or Indo-Pacific crocodile, *Crocodylus porosus*, regularly feed on large mammals and are known to occasionally include humans in their diet. Casualties caused by other large species of crocodilians (including Costa Rican *Crocodylus acutus*) do occur, but these are uncommon and generally not triggered by a feeding response. In many areas, excessive hunting pressure on crocodilians has reduced the average size of those species that, under ordinary conditions, would reach sizes capable of overpowering and devouring humans. In Costa Rica, effective protection over the past decades has now caused crocodiles to increase in number, but also in size; individuals are again reaching quite imposing sizes in some areas. Often, human fatalities are the result of careless interactions with these large predators, though even smaller individuals of *Crocodylus acutus* should always be approached with great care.

Family Alligatoridae
(Alligators and Caimans)

Three genera of this family occur in the New World tropics: *Caiman*, *Melanosuchus*, and *Paleosuchus*. A fourth, the genus *Alligator*, occurs in subtropical parts of North America. Only one species from this family, the spectacled caiman (*Caiman crocodilus*), is found in Costa Rica. It is a relatively small species, recognizable by the presence of a bony ridge across the snout, in front of the eyes.

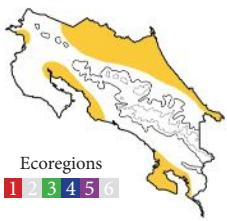


Caiman crocodilus

Least concern

Spectacled Caiman (*Caimán*, *Lagarto*)

A medium-sized crocodilian with a relatively short snout. Has a transverse bony ridge immediately in front of the eyes. Males to 108.2 in (275 cm) in total length; females generally smaller, to 88.6 in (225 cm).

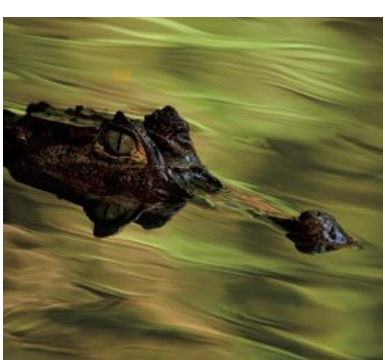


Caiman crocodilus is widespread in lowland rivers and wetlands, along both the Atlantic and Pacific slopes, ranging from Mexico southward throughout Central America and far into South America; from near sea level to 650 ft (200 m).

Natural history

Although its numbers were drastically reduced in 20th century, *Caiman crocodilus* is now quite common in many areas. It occurs in marshes, rivers, canals, and lakes in both the Atlantic and the Pacific lowlands, preferably in slow-moving waters with a muddy bottom and soft, sandy banks. It is more frequently observed during the dry season, when caimans are concentrated in shrinking bodies of water.

Because of its small size, *Caiman crocodilus* poses no threat to humans. Adults feed on small vertebrates such as fish, amphibians, and waterfowl; juveniles also eat insects and snails. Other than humans, adult *Caiman crocodilus* have few predators. Baby caimans, on the other hand, fall prey to numerous animals. Their most common predators are birds of prey and large herons, but larger caimans will also prey on small individuals.



Most often seen floating at the surface, with only its eyes, nostrils, and top of the snout visible. Using a powerful flashlight at night, it is possible to see the light reflected in their eyes. *Cayman crocodilus* sometimes basks out of the water, usually on a beach, sandbar, or partly exposed log, retreating rapidly into the water when approached.

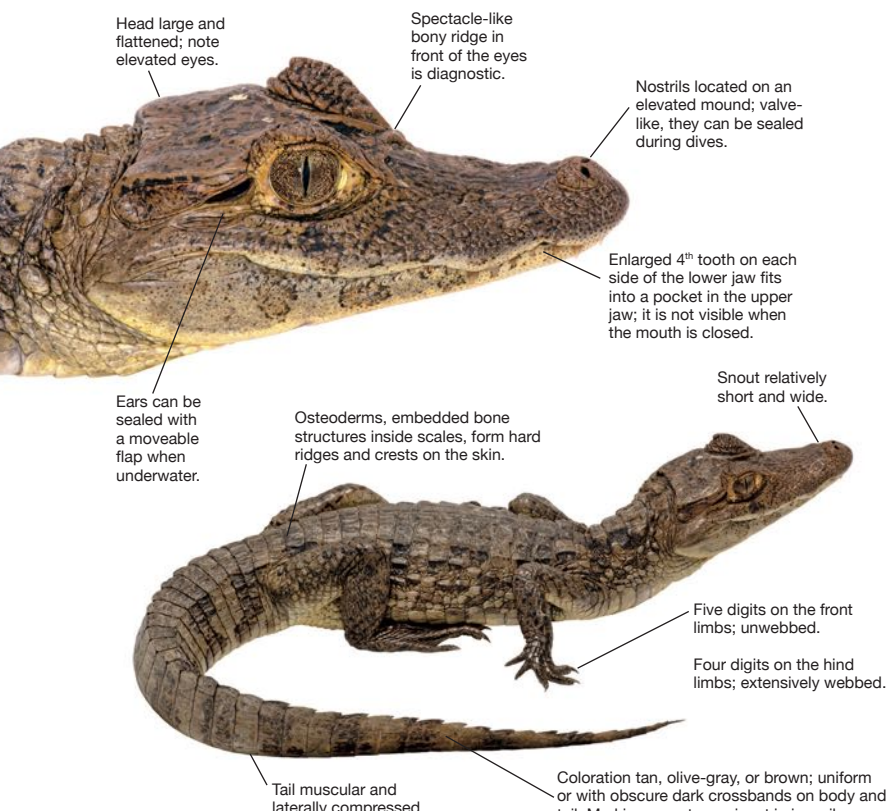
Caiman crocodilus reproduces in the rainy season, and mating is generally triggered by the onset of heavy rains and the subsequent rising water level in its habitat. Like all other crocodilians, caimans lay eggs. A clutch of 15–40 elliptical, hard-shelled eggs is deposited in a mound-shaped nest. The nest is constructed by the parents on a high section of a riverbank, preferably in a forested environment but always near water. It is sometimes butted up against tree trunks or hidden among vines. The nest consists of a low heap of vegetation and leaf litter, usually with a diameter of about 3–4 ft (100–120 cm). Parents remove nearby vegetation to clear a sizeable perimeter around their nest. The greatest risk to a caiman's nest is flooding by the adjacent body of water, because submerging the eggs can kill the embryos. However, egg predation by raccoons and other mammals is also a significant threat in some areas. Generally, the nest is guarded by one of the parents, and they will try to deter predators by thrashing the water with their tail and head, and growling and hissing.

Once the young are ready to hatch, after an incubation period of 75–90 days, a parent opens the nest by tunneling in or completely excavating the eggs. Hatching is possibly triggered by movement of the eggs, and the digging action of the parent may thus induce the babies to emerge. In addition, hatching *Caiman crocodilus* are known to vocalize from within the egg to attract their mother and to prompt her to open the nest. On the rare occasion

when there is no parent to help the hatchlings leave their nest, they tunnel out without assistance. Upon leaving the nest, hatchlings measure about 8–10 in (20–25 cm) from snout to vent.

In caimans, the gender of the offspring is not determined genetically, but rather by the ambient temperature at which the eggs are incubated during a specific period, the so-called thermosensitive period. Eggs incubated at the high end of the temperature spectrum produce female offspring, whereas lower temperatures produce male offspring. The mound of vegetation used to construct the nest gradually decomposes, and this process generates enough heat to raise the incubation temperature several degrees above the temperature of the surrounding substrate. Hatchling *Caiman crocodilus* tend to gather in sibling groups, sometimes with non-related young and accompanied by an adult female. These groups may stay together for several weeks after hatching, after which the juveniles disperse into densely vegetated backwaters. Little is known about the biology of small juveniles, as they are extremely secretive and stay hidden from view until they are larger and less susceptible to predation. Costa Rican populations belong to the subspecies *Caiman crocodilus fuscus*, and are characterized by their predominantly brown coloration.

Description

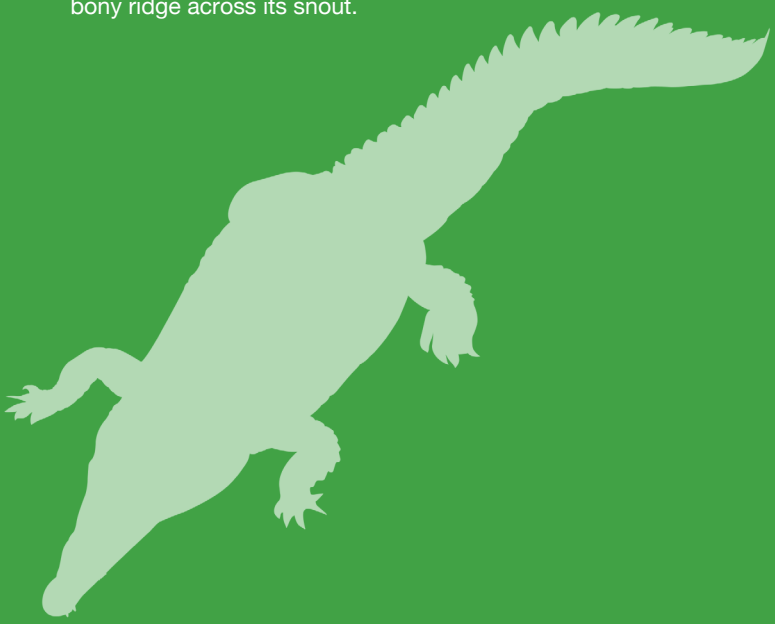


Similar species

- *Crocodylus acutus* (p. 21) is larger, has a longer snout, and lacks a bony ridge across its snout.

Family Crocodylidae
(True Crocodiles)

True crocodiles are found in tropical and subtropical regions throughout the world. A single species, the American crocodile (*Crocodylus acutus*), occurs in Costa Rica. This is a very large species that never has a bony ridge across its snout.



Crocodylus acutus

American Crocodile (*Cocodrilo*)

Vulnerable

A very large crocodilian with an elongated head and long, slender snout. Lacks a raised, bony ridge across the snout in front of the eyes. One of the largest crocodilians in the world; total length to 287 in (730 cm) in males; females (and most males) considerably smaller.

Crocodylus acutus is gradually becoming more widespread in lowland rivers, lagoons, and swamps, from extreme southern Florida on the Atlantic coast and Sinaloa, Mexico, on the Pacific coast, southward throughout Central America and into Colombia and Venezuela; near sea level to 1640 ft (500 m). It also occurs on several Caribbean and Antilles islands.

Natural history

Crocodylus acutus inhabits rivers, swamps, lagoons, and estuaries in lowland areas; individuals are most frequently seen basking on shore or on sandbars, where they may lie motionless for hours on end. When their body temperature becomes too high, they either enter the water or open their mouth to cool down. All crocodiles are excellent swimmers, using the long muscular tail for propulsion; large individuals can remain submerged for more than one hour.

Toward the end of the dry season, female *Crocodylus acutus* deposit 20–60 elliptical, hard-shelled eggs in a shallow nest excavated near the water. After the eggs are laid, the female fills up the nest chamber with soil or plant material and conceals the nest. The female remains near the nest during the incubation period. The eggs hatch roughly two and a half to three months later, often coinciding with the beginning of the rainy season.

Coloration and pattern characteristics are most prominent when the animal is wet; basking crocodilians are often caked with mud and appear uniform gray.

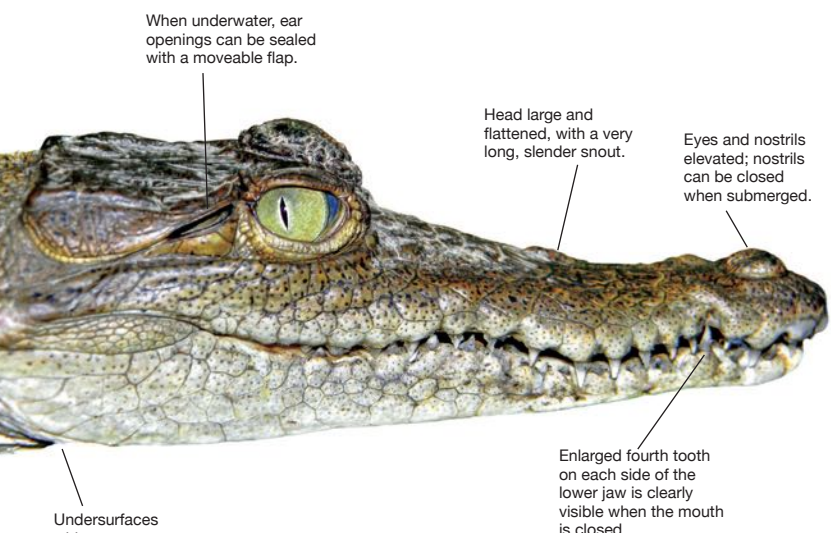
Just prior to hatching, some of the hatchlings start calling from inside the nest to attract the attention of their mother. She opens the nest cavity, using her front feet, and helps her offspring leave the nest. If the nest is located some distance from the water, the mother will pick up the hatchlings in her mouth and carry them to the water, one by one. The sex of hatchlings is not determined genetically, but instead is influenced by the incubation temperature of the eggs during a critical thermosensitive period in embryonic development.

Crocodilus acutus is also known to excavate burrows in river banks to be used as retreats. The burrow is invariaby located above the water level, but its entrance is normally underwater.

Crocodiles have long been hunted for their hides, while large individuals were feared and killed outright. This persecution led to greatly reduced population sizes and many local extinctions. *Crocodylus acutus* is now protected by law and hunting them is illegal. In many areas, protective measures have been very successful and larger crocodiles are once again being reported, and many populations are growing in size. The flip side of this conservation success story is that with expanding crocodile and human populations, interactions have become more common. Now that larger crocodiles are roaming Costa Rica's rivers again, the potential for dangerous encounters is increasing. Generally, *Crocodilus acutus* feeds on all kinds of aquatic animals, including crabs, amphibians, and fish; infrequently it will consume water birds or small mammals. However, large crocodiles are powerful and potentially dangerous animals capable of overpowering and killing livestock as well as humans. In the past two decades, a few people have been killed by crocodiles in Costa Rica; any crocodiles over 6 ft (190 cm) in total length should be treated as potentially dangerous.

Although considered "Vulnerable" throughout its range, populations in Costa Rica have rebounded to the point that on a national level *Crocodylus acutus* is now considered "Least concern."

Description



Osteoderms, embedded bone structures inside scales, form hard ridges and crests on back and tail.

Five digits on the front limbs; digits lack webbing.

Four toes on the hind limbs; extensively webbed.

Tail long, muscular, and laterally compressed.

Grayish-green, dark olive-green, or brownish-gray, with dark crossbands on the back and the tail. Dark crossbands on the back most obvious in juveniles, generally fading with age.

Similar species

- *Caiman crocodilus* (p. 18) is smaller, has a shorter snout, and has a bony ridge across the snout in front of the eyes.

Turtles
(Order Testudines)

Turtles, the most primitive of the surviving reptiles, date back to the Triassic period (at least 220 million years ago) and appeared long before the first dinosaurs. Despite their slow, deliberate movement, they have survived, in great part due to their morphology, which has changed little over the eons. All turtles characteristically share a set of traits that are inherited from a common ancestor, the most obvious one being the boxlike shell. This protective armor typically consists of a lower section, the plastron, which covers the belly, and an upper section, the carapace, which forms the actual shell. The carapace consists of modified ribs and vertebrae, as well as bony scutes that are coated with a keratin-based substance. The carapace and plastron are joined on the sides by bony bridges or ligaments. Interestingly, turtles are the only animals whose shoulder and pelvic girdles are contained within the rib cage.

In addition to their external body armor, all turtles share other unique adaptations. One very noticeable trait, seen in all contemporary turtles, is the absence of teeth; instead, the jaws are equipped with a hard, keratinous jaw sheath that grows with the developing skull.

Currently, some 335 species of turtle, divided over 14 families, inhabit a wide range of climates and habitats worldwide. Although some species are found in bone-dry deserts, many turtles are either aquatic or spend at least

part of their life in or near water. Two families of sea turtle (Cheloniidae and Dermochelyidae) are strictly marine animals, their encounters with dry land being restricted to a rapid crawl toward the sea after emerging from their nest on a tropical beach; adult females return occasionally to that same beach to lay eggs.

There are no live-bearing turtles—all species lay eggs. Some turtles simply deposit their eggs on the forest floor, but in general they are laid in a nest chamber that the female excavates using her hind feet. After laying her eggs, she backfills the nest with sand or leaf litter. Eggs hatch after an incubation period that varies in length from species to species, and whose duration can be affected by environmental conditions. In addition, the gender of turtle hatchlings is in many species determined not genetically, but by the incubation temperature during a critical, thermosensitive period in embryonic development. When the hatchling turtles tunnel their way out of the nest, they are immediately on their own. As soon as the female closes off the nest chamber, she abandons her offspring; parental care has not been documented in turtles.

With their distinctive morphology, turtles may appear strikingly different from other reptiles, but they are similar in many respects. Their exposed skin is typically dry and scaly. And they are also ectotherms, relying on an external source of heat to increase their body temperature (like other reptiles, they are frequently seen basking in the sun).

Individuals in many species can withdraw their head, limbs, and tail inside the shell. This feat is performed with varying degrees of success. Some turtles can withdraw protruding body parts and even seal their shell; this is made possible by a hinged plastron, a characteristic most prominent in the mud turtles (family Kinosternidae). Some species in that family are even known to survive forest fires inside their closed shell. But other turtles, such as *Chelydra acutirostris*, appear to have outgrown their armor; they cannot retract their head, limbs, and tail for lack of space inside. No marine turtles have the ability to withdraw their extremities within the shell.

The population sizes of many turtle species are currently at an all-time low. Delayed maturity (some species do not breed until they reach 15–20 years) make them slow to replenish their populations. Most terrestrial species have a small home range and never move long distances, making them very susceptible to the effects of changes to their habitat.

And, recently, other factors are starting to affect turtle populations worldwide to an even greater degree; the global change in climate is causing air and water temperatures to rise. Marine turtle eggs, deposited on tropical or subtropical beaches, depend on a relatively narrow temperature range to result in offspring that are half female and half male. Higher than normal environmental temperatures can cause skewed sex ratios in sea

turtle hatchlings, or even kill incubating eggs. Plastic pollution, especially the careless disposal of single-use shopping bags, is causing problems for leatherback turtles (*Dermochelys coriacea*), which feed primarily on jellyfish and cannot distinguish their preferred prey from a plastic bag floating in the ocean, often with lethal consequences. And freshwater turtle populations fall prey to poorly regulated and unsustainable harvesting for human consumption, especially in Asia. Turtles from other parts of the world are now harvested and exported to Asian countries to meet the insatiable demand for these animals. After having survived more than 200 million years, many turtle species, including several found in Costa Rica, are now on the brink of extinction.

Costa Rica is home to 14 species of turtle; 5 marine species that breed on the country's beaches, and 9 freshwater or terrestrial species that are found throughout the lowlands and foothills along both slopes.

Marine Turtles
(Families Cheloniidae and Dermochelyidae)

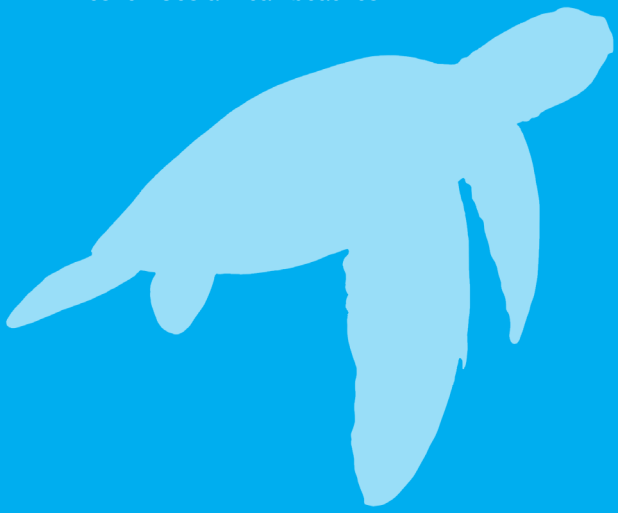
Members of the family Cheloniidae are marine turtles with a hard, bony shell. The only other family of marine turtles, the family Dermochelyidae, consists of a single leathery-shelled species, *Dermochelys coriacea*. All marine turtles typically have paddle-like limbs that are not differentiated into fingers or toes; the only indication of individual digits is the presence of one or two curved nails on each front flipper. These nails are usually more strongly developed in males than in females.

Members of both families spend the majority of time in open water. A few species are more likely to frequent shallow waters and coral reefs and can be encountered when diving or snorkeling. Most people's experience with these ancient creatures, however, is limited to the nighttime observation of nesting females on a Pacific or Atlantic beach. When visiting a sea turtle nesting site, it is important to go with a qualified guide and to carefully observe all rules that help minimize stress on these animals. Most importantly, you should avoid making loud noises or sudden movements; approach turtles from behind and maintain a low profile. Avoid using regular flashlights or flash photography, because bright lights immediately disturb nesting turtles. Light with a red filter is more appropriate. Be attentive, and slowly move away if a turtle appears to be stressed.

Eating sea turtle eggs or meat, or purchasing products made from their shells or skin, is illegal in most places; it is unethical everywhere.

Family Cheloniidae
(Hard-shelled Sea Turtles)

The family Cheloniidae includes six species of sea turtle, assigned to five genera. The majority of these species is found throughout most tropical and subtropical oceans and seas, and nests in many locations around the world. Four species, the loggerhead turtle (*Caretta caretta*), the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricata*), and the olive ridley (*Lepidochelys olivacea*), periodically nest on Costa Rican beaches.



With their streamlined heart- or shield-shaped shell and flipperlike limbs, sea turtles are well adapted to a life at sea. Chelonids usually live in tropical waters, although individuals of some species range into temperate seas in the summer for breeding, sometimes traveling great distances from the tropical waters in which they feed. Marine turtles return to the same beach on which they hatched to lay their own eggs, presumably guided by the stars and/or specific characteristics of ocean currents.

Sea turtles grow very slowly; green turtles may require up to 40 or 50 years before reaching sexual maturity and reproducing for the first time, but other species tend to mature faster and require 3–30 years. Males and females congregate in shallow water near the nesting beach to mate. Copulating pairs often float at the water's surface, with the male atop the female. Males have enlarged, hooklike claws on the front flippers and a long, prehensile tail that aid in providing a firm grip. Females typically reproduce every 2–4 years. In breeding years, they lay from two to five egg clutches at intervals of several days. To lay her eggs, the female crawls ashore, usually on a dark, relatively moonless night. She digs a deep nest chamber with her hind flippers and deposits dozens of leathery-shelled, spherical eggs inside. Once egg-laying is finished, she fills the nest cavity with sand and uses her flippers to wipe away traces of her activity.

At sunrise, the nesting beach is usually empty; the nesting turtles have shuffled back into the water and swum off. A few weeks later, at night, the beach becomes alive again as hordes of sea turtle hatchlings tunnel out of the nest and head for the water. Often, a variety of predators await the hatch, and many of the newly hatched turtles never reach the surf. Although much more agile in their marine environment, hatchling sea turtles still face many predators there. Few turtles survive their first year.

Once numerous, all sea turtles are currently endangered. Several centuries of relentless poaching of eggs and adult turtles (turtle meat is considered a delicacy), and hunting to obtain their skin, shells, or oil, have drastically reduced the size of sea turtle populations. Beach front developments continue to destroy nesting sites; commercial shrimp fishermen, who operate near shore, drown gravid females in their nets; and globally rising temperatures interfere with the sex ratio of sea turtle offspring, because the sex of the hatchlings is determined by their incubation temperature. Although sea turtles are protected by international laws, limited funds and limited resources mean that these are often not strictly enforced. All sea turtles are protected by international law. All are listed on appendix I of the Convention on International Trade in Endangered Species (CITES), meaning no trade is allowed, or trade is allowed only with permits under exceptional circumstances; all sea turtles are also included in the IUCN Red Data Book.

Caretta caretta

Endangered

Loggerhead Turtle (*Tortuga Caguama*)

A large to very large marine turtle, with flipperlike limbs, a big head, and distinctive brown to reddish-brown carapace. Differs from other hard-shelled marine turtles in having 5 pairs of costal shields. Carapace length to 83.8 in (213 cm), but generally much smaller.

Found in nearly all tropical oceans, and regularly enters subtropical and even temperate waters. In Central America, it only nests on Atlantic beaches, generally farther north than Costa Rica. Only a few nesting records known from Tortuguero and Gandoca-Manzanillo.

Natural history

The largest hard-shelled marine turtle in the world, this species sometimes weighs more than 660 lbs (300 kg). In Central America, it nests only on the Caribbean coast, where it is sporadically seen on sandy beaches. It frequents coral reefs and shipwrecks and is often encountered on diving and snorkeling trips.

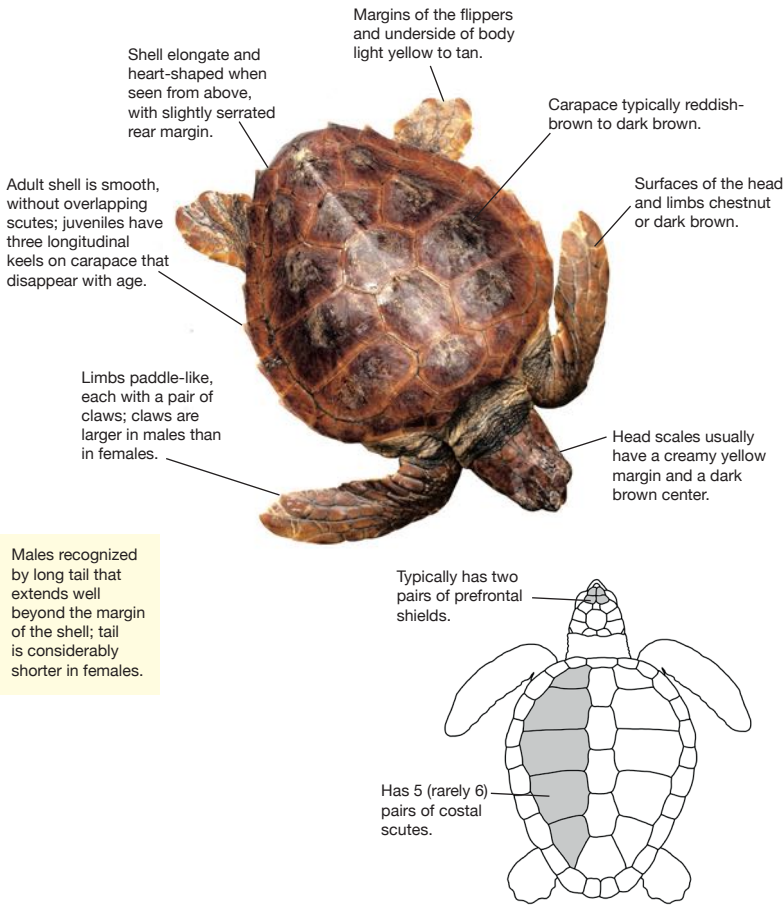
Caretta caretta mate in the water, near their nesting grounds. The male mounts the female and holds onto her with the aid of large claws on each of his flippers. The couple may mate for more than three hours. Females come ashore at night, usually at high tide, to lay their large clutches of round eggs. The clutch size for *Caretta caretta* ranges from 60–200 eggs, with an average of 125. During a breeding season, a female may nest several times at intervals of 12–15 days. The hatchlings emerge from their underground nest 7 to 10 weeks after the eggs are laid, depending on the incubation temperature. Ambient temperature not only influences the length of the incubation period, it also affects the gender of the hatchlings.

Little is known about the natural history of juveniles after they crawl out of their nest and disappear into the surf. Juvenile turtles that are more than a year old are sometimes seen in coastal waters, but sightings of younger turtles are extremely rare. In one instance, loggerhead babies were seen in a floating sargassum (seaweed) raft. Whether young loggerheads stay exclusively in sargassum rafts is unknown, but because the rafts provide food and protection, they would seem to be an ideal habitat.

Studies on the stomach contents of *Caretta caretta* indicate they are omnivores, yet their powerful jaws and broad, muscular head suggest they are carnivorous. It is possible that the algae and other vegetation found in their stomachs may have been ingested incidentally as they fed on shrimp, crab, squid, mollusks, and jellyfish.

The meat of *Caretta caretta* is not valued as much as that of most other marine turtles, although there is very high demand for their eggs. Unfortunately, poaching is only one of many threats they face. Development of nesting beaches for tourism and the use of shrimp nets, in which marine turtles drown, also take a toll. Photo pollution is partly responsible for a high hatchling mortality; when these turtles emerge from their nest, they move toward the brightest area on the horizon, which generally indicates the location of the ocean. Increasingly, lots of hatchlings are misled by the glow of urban lights and head away from the ocean, toward land. The following day, they die from the heat of the sun.

Description



Similar species

- *Chelonia mydas* (p. 32) has only 4 costal scutes on each side of the carapace.
- *Lepidochelys olivacea* (p. 37) has a nearly circular carapace with 6–9 costal scutes.
- *Eretmochelys imbricata* (p. 34) has overlapping scutes on its carapace; there are 4 costal scutes on each side.

Chelonia mydas

Least concern

Green Turtle (*Tortuga Verde*)

The only marine turtle with a combination of flipperlike limbs, four non-overlapping costal scutes on each side of the shell, and only a single pair of large scales on top of its head, between the eyes and nostril. Carapace length to 59.0 in (150 cm).

Chelonia mydas occurs worldwide, in tropical, subtropical, and some temperate waters. In Costa Rica, it nests regularly on beaches of both coasts. Some researchers consider turtles from the eastern Pacific Ocean a separate species or subspecies, the black sea turtle (*Chelonia agassizii* or *Chelonia mydas agassizii*, respectively).

Natural history

Some authorities consider the genetic, morphological, and behavioral differences between Atlantic coast and Pacific coast populations of *Chelonia mydas* sufficient to recognize two separate subspecies (*C. m. mydas* on the Atlantic and *C. m. agassizii* on the Pacific coast), or even two separate species (*C. mydas* versus *C. agassizii*, respectively). However, this taxonomic split remains controversial, and both populations are treated here as belonging to a single species.

Chelonia mydas is a wide-ranging species of sea turtle that is still relatively common in Costa Rica, although it is severely threatened on a global scale. These large turtles have been persecuted for their prized flesh and eggs since historic times. They owe their common name *green turtle* not to the coloration of their skin or shell but rather to the greenish color of their fat. Green turtles are the only marine turtles known to come ashore not just to lay eggs but also to bask in full sunlight. Being primarily herbivorous, their diet is deficient in vitamin D since plants do not provide that vitamin. The turtle's body can produce this important chemical compound, provided it receives direct sunlight.

These turtles mate in the shallow waters off their nesting beaches, usually close to shore. Males have a single curved claw on each front flipper that is used to hold on to the female's shell during mating; these claws can cut into the female and sometimes cause significant bleeding. At times, more than one male simultaneously courts a single female, and occasionally a second, or even third, male climbs on top of a male who is already mounted on a female. In peak breeding season, during the offshore mating frenzy that takes place in areas with a high population density, one can see clumsy stacks of green sea turtles swimming awkwardly near the surface of the water.

Roughly between June and September, gravid females come ashore to nest. Under cover of darkness, a female lays 100 or so eggs in a cavity excavated with her hind flippers. After closing up the nest, the female returns to the sea, but may remain near the nesting beach in order to nest again. A female breeds only every 2–4 years, but during each reproductive season she produces several clutches of eggs at intervals of 12–15 days. The incubation period of the eggs is between 50–70 days, depending on ambient temperature, humidity, and other factors. Ambient temperature of the substrate surrounding the eggs also determines the sex of the hatchlings.

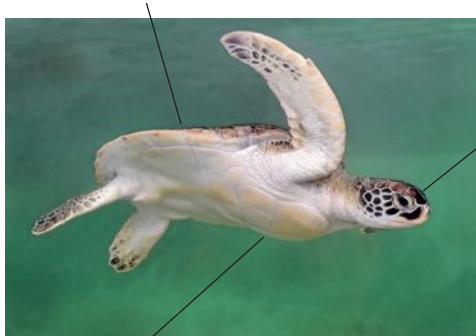
Chelonia mydas nests are raided by a variety of predators; dogs, raccoons, and other mammals dig up and eat large numbers of eggs every year. Hatchling sea turtles also suffer a high mortality rate since they often come under attack as soon as they leave the nest. Vultures, gulls, frigate birds, and crabs attack the baby turtles as they plod toward the ocean. According to some estimates, only 30% of the hatchlings reach the water; those that do make it face the threat of a wide variety of predatory fish in their new aquatic environment.

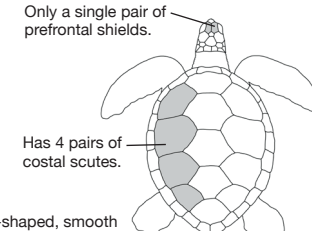
Once they reach the relative safety of the sea, the hatchlings drift away on ocean currents, riding in large, floating mats of seaweed. The hatchlings mainly feed on small invertebrates, but become increasingly vegetarian as they mature. Little is known about what happens to baby green

turtles during the first year of life, or where they go. A year after leaving the nest, they reappear in shallow coastal waters, in areas that have an abundance of the aquatic plants on which they graze until reaching maturity. These feeding grounds may be as far as 2000 miles (3200 km) from their birthplace. *Chelonia mydas* can take more than 30 years to reach sexual maturity. As soon as they do, they travel great distances to return to the same beach where they hatched decades before, probably using the position of the stars and ocean currents to guide them.

Description

Males have a long tail that extends well beyond the rear margin of the shell; it is much shorter in females.





A large turtle, with a heart-shaped, smooth carapace; rear margin not saw-toothed.

Similar species

- *Caretta caretta* (p. 30) has 5 costal scutes and two pairs of large scales on top of the head, between the eyes and nostrils.
- *Lepidochelys olivacea* (p. 37) has a nearly circular carapace with 6–9 costal scutes.
- *Eretmochelys imbricata* (p. 34) has 4 costal scutes on each side; all scutes on carapace overlap along their rear edge.

Eretmochelys imbricata

Hawksbill Turtle (*Tortuga Carey*)

Critically endangered

A relatively small marine turtle with flipperlike limbs; readily distinguished from other hard-shelled species by the distinctive beaklike upper jaw, the strongly saw-toothed rear margin of its carapace, and the uniquely overlapping scutes. Carapace length to 39.4 in (100 cm).

Eretmochelys imbricata occurs in seas and oceans worldwide; in Costa Rica, small numbers regularly nest on Atlantic beaches, and sporadically on some Pacific ones.

Natural history

Eretmochelys imbricata inhabits the warm tropical and subtropical regions of the Atlantic, Pacific, and Indian oceans, as well as the Caribbean. It is mainly a species of shallow coastal waters and is most often seen near underwater rock formations or coral reefs. On occasion, *Eretmochelys imbricata* is also found in estuaries. In Central America, it nests on scattered beaches along both coasts, which it shares with other species of marine turtles. *Eretmochelys imbricata* tends to nest individually, unlike green turtles and olive ridleys, which often nest in large numbers.

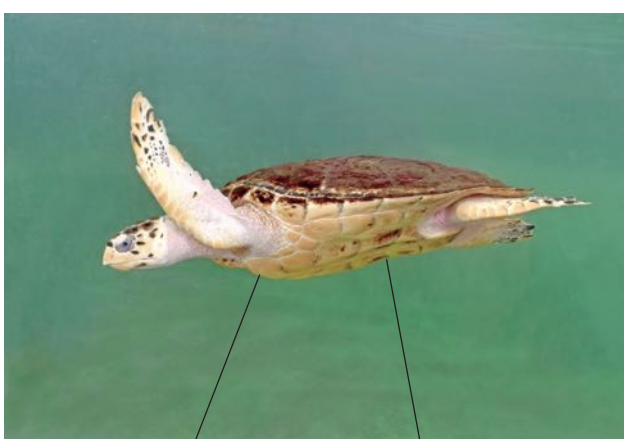
Mating and nesting generally take place between April and November, peaking around June or July. This species mates in shallow water near the nesting beach. Male *Eretmochelys imbricata* have a concave depression in their plastron which makes it easier to rest on the female's domed shell during mating. The paired claws on each front flipper also help the male to hold on to the female.

Every 2–3 years, a female can produce several clutches of eggs. At night, usually at high tide, she comes ashore and uses her hind flippers to dig a nest chamber, approximately 2-ft (60-cm) deep. Between 50–200 spherical eggs are deposited into the chamber, after which the female closes the nest and returns to the ocean. After an incubation period of 8 or 9 weeks, the hatchlings emerge.

Eretmochelys imbricata is omnivorous, though it tends to become increasingly carnivorous with age. Its diet includes sponges and other nonmobile marine invertebrates such as mollusks, tunicates, and bryozoans. These turtles are also known to eat fish and jellyfish, including the highly toxic Portuguese man-of-war (*Physalia physalis*). Various toxic components found in the jellyfish and sponges included in the hawksbill's diet are incorporated into its tissues; because of this, the meat of these turtles can be poisonous to humans.

The beautifully patterned, translucent shell of *Eretmochelys imbricata* was once the primary source of tortoiseshell, which has long been used to make combs, frames for glasses, and jewelry. This species has suffered enormously from the harvesting of these shells. Today, cheap synthetic alternatives for tortoiseshell are readily available, but poaching continues. Both the turtle's meat—even though sometimes toxic—and its eggs are prized. As a result, *Eretmochelys imbricata* is an endangered species, and its continued existence is uncertain.

Description

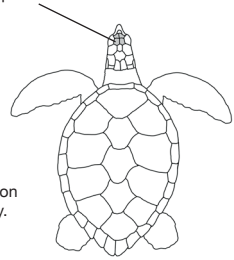


Scutes on the carapace overlap along their rear edges, a unique feature among sea turtles.

Carapace with four costal scutes on each side and a distinct keel down its midline (less pronounced in older turtles).

Carapace brown to reddish-brown, with a "tortoiseshell" pattern of pale cream or yellowish markings.

Two pairs of prefrontal shields.



Has a heart- or shield-shaped carapace with a serrated rear margin. Trailing edges of scutes on carapace overlap slightly. Usually has four pairs of costal scutes.

Similar species

- Hawklike bill and overlapping scutes on carapace are unique among sea turtles.

Lepidochelys olivacea

Olive Ridley (*Tortuga Lora*)

Vulnerable

A small marine turtle with flipperlike limbs, a nearly circular carapace, and 6–9 costal scutes. Carapace reaches 31.1 in (79 cm) in length.

Lepidochelys olivacea occurs widely throughout the Atlantic, Pacific, and Indian oceans. In Costa Rica, it only nests on Pacific beaches.

Natural history

Lepidochelys olivacea inhabits most tropical waters, but in Central America it only nests on the Pacific coast. This species is known to stage *arribadas*, or brief periods of synchronous nesting activity during which tens of thousands of sea turtles may congregate and nest at the same time on the same beach. *Arribadas* of *Lepidochelys olivacea* are famously known from Playa Ostional and Playa Nancite in northwestern Costa Rica, where they take place at irregular intervals throughout the rainy season (roughly July to December); peak *arribadas* occur in September or October. Breeding females congregate in shallow water off the coast on the night preceding an *arribada*, and start crawling ashore in massive numbers at, or around, high tide. Once the *arribada* is set in motion, nothing deters the turtles from nesting, neither the presence of

On a few beaches in northwestern Costa Rica, olive ridley sea turtles (*Lepidochelys olivacea*) sometimes nest in huge numbers. These mass arrivals (*arribadas*) can last several consecutive days and nights; all other sea turtles in the country only come ashore at night to lay eggs.

humans or predators, nor the arrival of daybreak, will stop wave after wave of additional turtles from arriving on the beach.

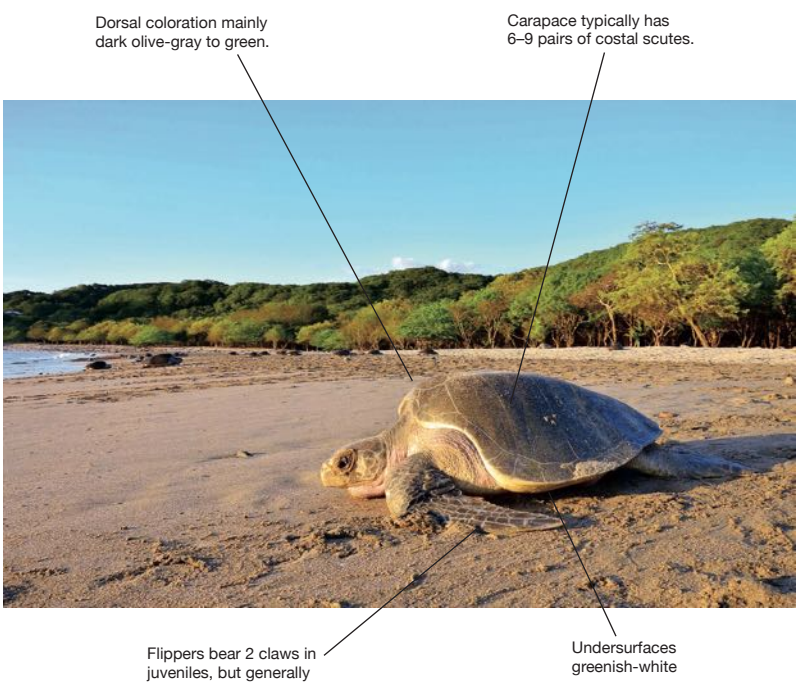
Reports indicate that during periods of unfavorable climatic conditions, such as extremely heavy rains, *Lepidochelys olivacea* can postpone egg-laying and retain its eggs up to 63 days. Most *arribadas* last several days, and it is estimated that as many as 150,000 to 200,000 *Lepidochelys olivacea* may have laid their eggs at Playa Ostional during such a brief period of time. Because the number of nesting turtles can be enormous, many turtles nest in places where earlier arrivals have already laid eggs and, as a result, 70% to 80% of those early eggs are dug up or destroyed. The hatching success of nests is in the 5% range, and even the vast majority of the nests that are not disturbed by other nesting turtles or predators do not develop. A wide variety of predators awaits the hatchling turtles as they make their way to the surf upon hatching.

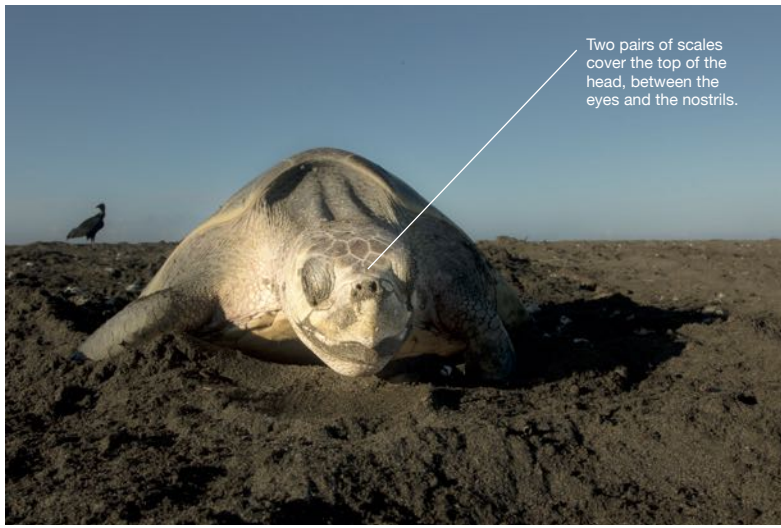
Costa Rican Congress approved a management plan that legalizes the controlled harvesting of turtle eggs on Playa Ostional. Since 1987, the townspeople of Ostional have been allowed to harvest all eggs laid during the first 36 hours of an *arribada*, which amounts to roughly 3 million eggs, an estimated 10% of the yearly total deposited on that beach. Many of these eggs find their way to bars throughout the country, where they are sold as appetizers.

Although the number of *Lepidochelys olivacea* surviving worldwide is probably greater than that of any other sea turtle species, their future is far from assured. Despite formal protection, the number of nesting females that come ashore to Costa Rica during *arribadas* is steadily declining.

Lepidochelys olivacea is probably the most common of the marine turtles, but it faces many challenges due to habitat loss, irresponsible development of coastal nesting areas, global climate change, and the risk of drowning in nets used by commercial fishing trawlers and poachers.

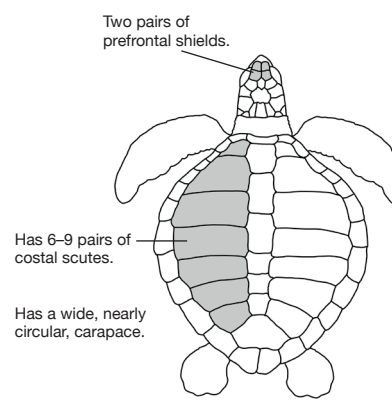
Description





Shape of plastron sexually dimorphic: flat in females, concave in males.

Males have a long tail that extends far beyond the margin of shell; in females, it barely reaches the shell margin. Juveniles have three distinct longitudinal keels on their carapace that become less obvious with age; the central keel usually remains visible, even in older individuals.



Similar species

- *Caretta caretta* (p. 30) is much larger, with a distinctive reddish-brown coloration on the head and flippers; it usually has 5 costal scutes.
- *Chelonia mydas* (p. 32) has only 4 costal scutes on each side of the carapace.
- *Eretmochelys imbricata* (p. 34) has overlapping scutes on its carapace, and only 4 costal scutes on each side.

Family Dermochelyidae
(Leatherback Turtle)

The leatherback turtle family consists of a single, extant species, *Dermochelys coriacea*. The leatherback turtle is the largest living turtle and ranks among the largest reptiles in the world. The longest individual on record measured 96 in (244 cm); and weights of up to 2020 lbs (916 kg) have been recorded for this species!

The genus *Dermochelys* is unique among sea turtles in that it lacks the bony plates that make up the hard shell of all other marine species in the family Cheloniidae. Instead, the carapace and plastron of all but the very smallest of juveniles consist of smooth, leathery skin, with embedded small bony plates. The dorsal skin is supported by seven longitudinal bony ridges that form the carapace.

Dermochelys coriacea occurs in all major oceans. Its main nesting beaches are restricted to tropical regions, but adult leatherback turtles regularly migrate into cold water. In Costa Rica this species nests in small numbers along both coasts.

Dermochelys coriacea

Leatherback Sea Turtle (*Tortuga Baula*)

Vulnerable

An enormous marine turtle with flipperlike limbs. This is the only marine turtle with a ridged, leathery shell in place of hard scutes. Carapace length reaches 70.9 in (180 cm).

Dermochelys coriacea ranges throughout oceans and seas worldwide, including some very cold northern and southern waters; it nests only on tropical beaches, including on both coasts of Costa Rica.

Natural history

This marine turtle is mostly found in the open ocean. After individuals leave their nesting beach in tropical waters, they wander long distances across the Atlantic, Pacific, and Indian oceans. Along the coasts of the Americas, *Dermochelys coriacea* is seen as far north as Newfoundland and British Columbia and as far south as Chile and Argentina. This is a powerful swimmer, and with its streamlined body and large flippers it can reach speeds in excess of 5.5 mph (9 kph). During their migration, leatherback turtles range farther north and farther south than any of the other marine turtles. Most likely they follow their favorite prey, jellyfish, into these cold waters. *Dermochelys coriacea* can survive in such cold waters because of its ability to increase its body temperature over the ambient temperature, using heat generated by its muscle action. Due to its high volume to surface ratio, the availability of insulating fatty tissue, and specific adaptations in its circulatory system that help direct warm blood away from its exposed skin, it can minimize heat loss. These turtles are able to maintain a body temperature of about 77 °F (25 °C) in seawater that may be 45 °F (18 °C) cooler than its body's core. Internal generation of body heat is unusual among reptiles, and *Dermochelys coriacea* is the only turtle known to do this.

Dermochelys coriacea mainly preys on jellyfish, although it may also occasionally feed on other soft-bodied marine invertebrates. It is known to dive to depths of up to 3935 ft (1200 m) in pursuit of prey. Long, spine-like projections on the upper jaws and in the esophagus help them grasp and swallow their slippery prey. The stingers and chemical defenses found in many jellyfish do not harm these turtles. Recently, many *Dermochelys coriacea* have died due to the ingestion of plastic bags, which are apparently mistaken for jellyfish; in one study, over 40% of the turtles examined had plastic in their intestines.

Like all marine turtles, *Dermochelys coriacea* mates in the open ocean. Females do not nest every year; but in years when they do nest, they lay several egg clutches at intervals of about 10 days. Gravid females crawl to shore after dark at high tide, usually on a dark, overcast night. After excavating the nest chamber, the female lays 50–170 spherical eggs measuring 2–2.5 in (5.0–6.5 cm) in diameter. When a nesting female feels threatened, she emits loud sighs, groans, and belches. If harassed or approached too closely, she will flail at the assailant with her flippers. Hatchling turtles tunnel to the surface of the nest on a dark night approximately 8–10 weeks after nesting, and head for the surf.

Prime leatherback turtle nesting beaches in Costa Rica include Gandoca-Manzanillo on the Atlantic coast, and Las Baulas National Marine Park near Playa Grande and Playa Tamarindo on the Pacific coast. Nesting may take place over a period of several months, but peak nesting activity on the Pacific coast tends to be December–February (April–May on the Atlantic coast).

Dermochelys coriacea is a critically endangered species. Excessive hunting to obtain oils used to produce cosmetics and over-collecting of the prized eggs threaten this species with extinction. Although protected under the US Endangered Species Act and the Convention on the International Trade in Endangered Species (CITES), leatherback turtles face an uncertain future.

Description

Carapace uniquely marked with seven longitudinal ridges; plastron with five ridges. Ridges most prominent in juveniles, but wear with age (particularly on plastron).

Shell, head, and limbs sometimes marked with irregular light spots (white, cream, yellow, or pink); usually most vivid in juveniles.

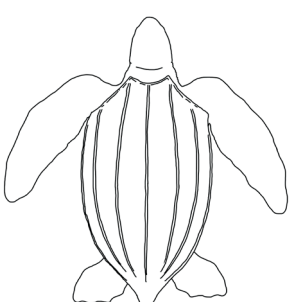
Generally has a uniformly dark dorsum, either dark brown, slate-gray, or blue-black.

Skin thick and leathery; lacks hardened scales in all but the youngest juveniles.

Undersurfaces mostly dirty white to pale gray.

Limbs long and paddle-like, without claws.

Shape of plastron sexually dimorphic: concave in males and flat in females. Tail long in males, extending beyond the length of the hind limbs; substantially shorter in females.



Carapace streamlined and elongate, with seven prominent longitudinal ridges that support its leathery shell.

In hatchlings and small juveniles, the location of the dorsal and ventral keels is indicated by a linear series of raised light-colored (white, cream, bluish-gray) scales.

Similar species

- No other marine turtle has a ridged, leathery shell.

Freshwater Turtles
(Families Chelydridae, Emydidae, Geoemydidae, and Kinosternidae)

Nine species of freshwater turtles in four families inhabit Costa Rica. They are found in a variety of wetlands in the lowlands or foothills of both coasts. Although many freshwater turtles swim very well and may have extensively webbed hind feet, they never have flipperlike limbs like sea turtles do. All Costa Rican freshwater turtles have well-developed digits on all their limbs.

The degree to which these nine species are aquatic varies considerably. Both *Trachemys* species, as well as *Rhinoclemmys funerea*, are common river turtles that are frequently seen swimming and basking in large lowland rivers. *Rhinoclemmys annulata* and *Rhinoclemmys pulcherrima* are mostly terrestrial, the former inhabiting Atlantic rainforests, while the latter is found in Pacific dry forest habitats—usually near streams and swamps. The three mud turtles of the genus *Kinosternon* are aquatic, but inhabit ponds, swamps, and sometimes small streams, instead of large rivers. They tend to walk on the bottom of wetlands rather than swim. The same is true for the large, prehistoric-looking *Chelydra acutirostris*, which has strong legs that allow it to walk along the bottom of a variety of aquatic habitats, as well as cover significant distances on land.

Family Chelydridae
(Snapping Turtles)

The five representatives of this small, strictly New World family are large aquatic turtles, placed in two genera: *Chelydra* and *Macroclemys*. *Macroclemys temmincki*, the alligator snapping turtle of southeastern and central United States, is the world's largest freshwater turtle; it can reach a carapace length of over 27.6 in (70 cm) and a weight of up to 175 lbs (80 kg).

Once thought to be a single, wide-ranging species, the common snapping turtle (*Chelydra serpentina*) was relatively recently split into three separate species. The South American snapping turtle (*Chelydra acutirostris*) is quite widespread in Costa Rica. Although it is considerably smaller than the alligator snapping turtle, large adults are nonetheless a very impressive sight.

These prehistoric-looking turtles are characterized by a flattened carapace with bony scutes that form three longitudinal keels (pronounced in juveniles but often only faintly indicated in adults). The rear margin of the carapace is strongly serrated. Typically, the plastron is cross-shaped and greatly reduced, leaving much of the soft body parts exposed. Protruding from the shell are a very long tail that equals or even exceeds the length of the carapace, powerful legs, and a massive head.

Chelydra acutirostris

Least concern

South American Snapping Turtle (*Tortuga Lagarto*)

A large, prehistoric-looking turtle that has a huge head, a very long tail, and massive limbs with strong claws. Carapace has three keels; plastron greatly reduced and shaped like a cross. Carapace reaches 19.3 in (49 cm) in adult males and 15.4 in (39 cm) in adult females.

Chelydra acutirostris ranges from eastern Honduras southward through lower Central America and into South America as far as western Ecuador. In Costa Rica it is found in lowlands and foothills of both slopes, including scattered localities in the dry northwest; from near sea level to 3800 ft (1160 m).

Natural history

Chelydra acutirostris is relatively common but infrequently seen in Costa Rica, mainly because it is nocturnal and lives in aquatic habitats. This species inhabits stagnant bodies of water, slow-moving rivers, and forest streams. It prefers pools with a soft, muddy bottom and abundant aquatic vegetation, although it is also known to enter brackish water. *Chelydra acutirostris* prefers warm shallows, where it generally remains motionless, partially buried in the substrate or hidden beneath vegetation, occasionally extending its long neck to the water surface to breathe.

Even though this is a highly aquatic turtle, it is a poor swimmer and generally moves by strolling on the bottom. Its robust limbs, which are not flattened into flippers, and the greatly reduced plastron that allows for a great range of motion in the limbs, support a walking mode of locomotion. On land, these turtles can raise their body off the ground and walk considerable distances, even climbing over obstacles. *Chelydra acustirostris* basks while submerged in warm, sun-exposed shallows, and only leaves the water to find a suitable nest site or to migrate to a different body of water. Generally, on land movements take place under the cover of darkness, but individuals do move during the day at times, usually in heavy downpours.

Chelydra acutirostris breeds during the rainy season, from March to November. Mating takes place in the water, and gravid females invariably nest on land, often a considerable distance from the water. The female excavates a flask-shaped cavity where she deposits 20–40 hard-shelled eggs

A hatchling *Chelydra acutirostris*; note the white egg tooth on its snout. This sharp projection allows baby turtles to slice open the egg shell from the inside and facilitate hatching; the egg tooth usually falls off a few days after the hatchling leaves the egg.

the size of a ping pong ball (as many as 83 eggs have been reported from a single female in related species). She uses her hind feet to place the eggs inside the nest.

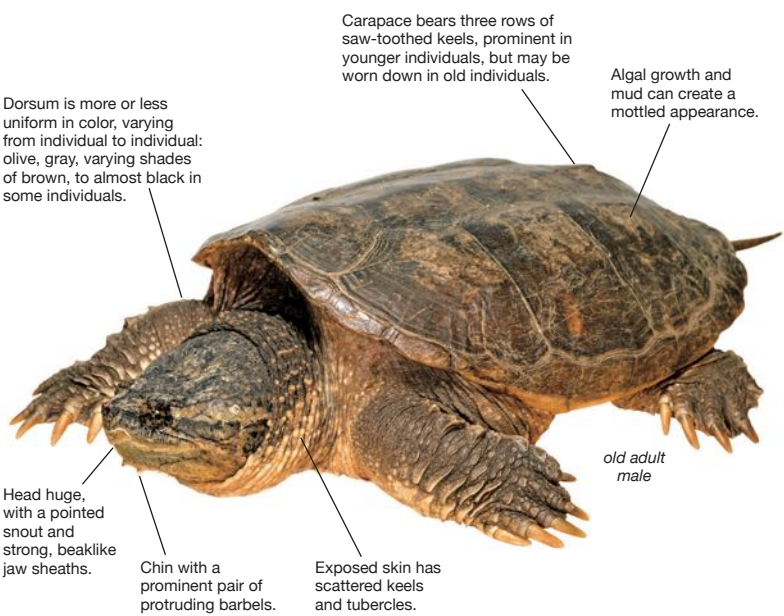
In Costa Rican populations, incubation lasts 55–125 days, depending on the ambient temperature. Incubation temperature also determines the gender of the hatchlings, as *Chelydra acutirostris* displays temperature-dependent sex determination. In populations outside Costa Rica, incubation temperatures below 68 °F (20 °C) and above 86 °F (30 °C) resulted in all female offspring; at intermediate temperatures, most offspring are males. Incubation at 77 °F (25 °C) resulted in 100% male offspring, but an increasing percentages of females emerged at temperatures above that. Female snapping turtles are capable of retaining viable sperm for many years, and they can produce several clutches of fertilized eggs after mating only once.

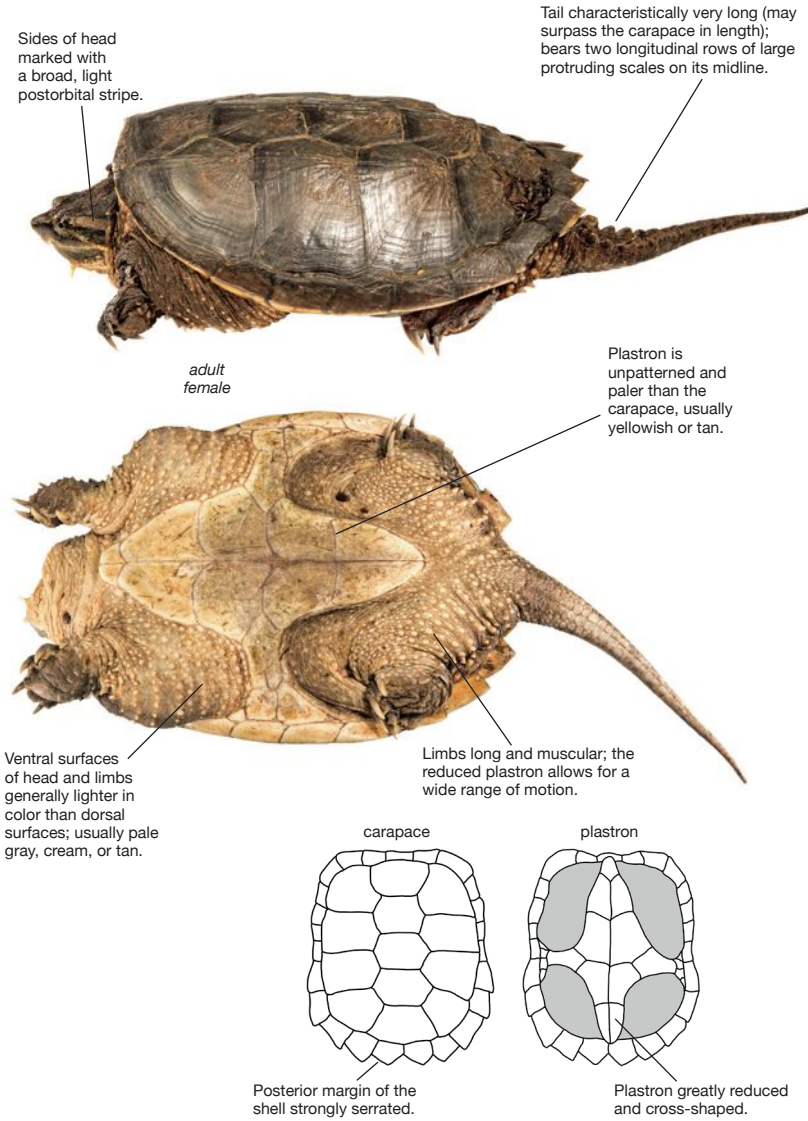
Chelydra acutirostris is omnivorous; its prey includes aquatic invertebrates, fish, amphibians, reptiles, waterfowl, and small mammals, as well as aquatic vegetation. Snapping turtles are also good scavengers and consume a fair amount of carrion. Humans are doubtless the most significant hunter of these turtles, which have few predators as adults. This species has been eradicated from many areas throughout its range because of overhunting for its prized meat and eggs. Juveniles and eggs are preyed on by a variety of wading birds, mammals, snakes, and crocodilians; small individuals were formerly common in pet stores in San José, where they were sold as "living fossil" pets.

Chelydra acutirostris is well-known for its irascible temper on land, but in the water it is docile and shy. When approached in the water, it will remain still and rely on its camouflage. However, when harassed on land, these turtles will readily strike and bite. Its long neck gives it a surprisingly long striking range, and the powerful, hooked jaws can deliver a painful bite.

This species is referred to as *Chelydra serpentina* in older literature.

Description





Similar species

- No other Costa Rican turtle resembles this species; the long tail, long neck, large head, and greatly reduced plastron are all diagnostic.

Family Emydidae
(Pond Turtles and Box Turtles)

After being split from the family Geoemydidae, 53 species in 10 genera remain in the family Emydidae. With the exception of two Eurasian pond turtles, all Emydidae are located in the New World. The taxonomic allocation of the two Costa Rican species still remains unsettled, and they have been variously placed in the genera *Chrysemys, Pseudemys*, or *Trachemys*, depending on the author.

Although difficult to distinguish from the genus *Rhinoclemmys* (family Geoemydidae) based on external morphology, the two Costa Rican species of *Trachemys* are the only freshwater turtles whose head and neck are greenish or gray and marked with prominent yellow or orange stripes. Their feet are fully webbed; the carapace shows a variety of markings, but usually contains distinct red ocelli on a green background (this pattern may be obscured in large adults).

Juvenile sliders are often brightly colored and have a contrasting pattern, but they lose this as they get older.

Trachemys emolli

Nicaraguan Slider (*Tortuga Resbaladora*)

Near threatened

A large aquatic turtle with a relatively flattened shell and fully webbed feet. Juveniles have a single, low median keel that disappears with age. Carapace marked with orange or red circles with dark centers. Limbs, neck, and head greenish or gray, with prominent yellow stripes. Postorbital stripe broad and often shows an orange hue; stripe does not come into contact with the eyes. Carapace length to 15.7 in (40 cm) in females; males much smaller.

Trachemys emolli occurs in the large lakes of Nicaragua (Lake Managua and Lake Nicaragua) and in associated rivers and tributaries, including the San Juan River, which runs between Nicaragua and Costa Rica; from near sea level to 200 ft (60 m).

Natural history

Trachemys emolli is a recently (2002) recognized species; it was formerly considered a subspecies of what is now known as *Trachemys venusta*. The taxonomic history of both species is confusing and complex, making it difficult to extract relevant information from older literature (this species has been referred to as *Trachemys scripta emolli*, *Trachemys grayi emolli*, *Pseudemys scripta*, *Chrysemys scripta,* and *Chrysemys ornata* in various publications). Regardless of the debates, *Trachemys emolli* is closely related to *Trachemys venusta*, and shares a similar appearance and habitat preference; presumably the biology of both species is also similar.

Trachemys emolli occurs in vegetation-choked lowland rivers and lakes and is most often seen as it basks—sometimes in great numbers—on mats of emerging aquatic vegetation, logs, rocks, and sandbars. This is a large turtle with a low-domed, smooth shell and powerful legs that have fully webbed feet for rapid propulsion in the water. Built for an aquatic life, these turtles are agile swimmers.

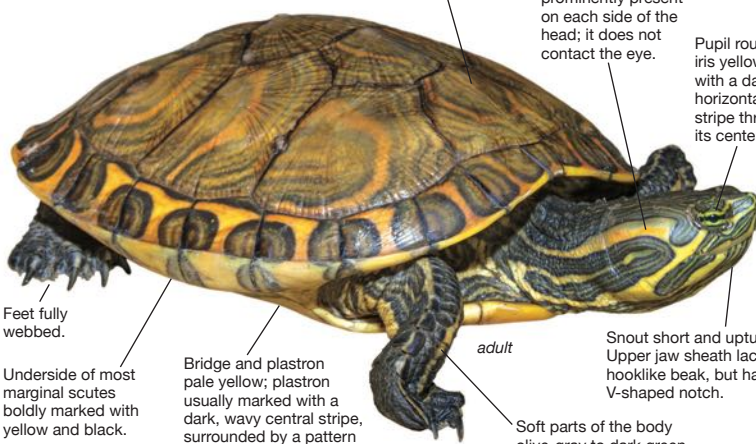
Reproductive behavior in *Trachemys emolli* is presumably comparable to that of *Trachemys venusta*. Mating, which is preceded by a brief courtship ritual, takes place in the water. Females excavate a nest in an exposed location, usually close to the water but sometimes at a considerable distance. Multiple clutches may be produced throughout the year, but the peak of the reproductive season coincides with the dry season (December through April).

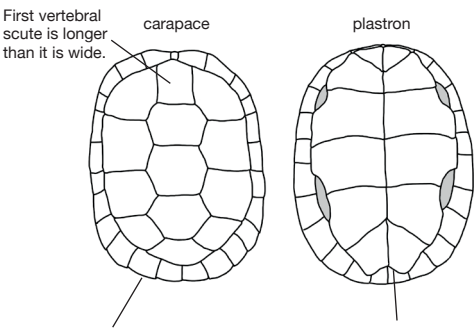
The eggs require at least two months before they hatch, and hatchlings may remain inside the nest for a prolonged period of time if conditions for emerging are not right. *Trachemys emolli* is subject to temperature-dependent sex determination, meaning that the gender of its offspring is not genetically determined, but rather is the result of the prevailing incubation temperature during a sensitive period in embryonic development.

Juvenile *Trachemys emolli* are mainly carnivorous and eat a wide variety of invertebrate prey when young; they switch to a mainly vegetarian diet as they age.

Like other turtles, large adults of this species have few predators, but small juveniles and eggs fall prey to a variety of predators, including coyotes, raccoons, herons, egrets, raptors, vultures, and crocodilians. In some areas in its range, particularly in rural areas, humans hunt adult *Trachemys emolli* for their meat, and also collect their eggs. While this species is still common, population sizes can be depressed locally because of overharvesting. Large turtles like this generally require several years of development before they reach sexual maturity; long-lived, slow-paced species tend to be significantly affected by even limited removal of large adults, especially older females.

Description





The shape of the postorbital stripe is quite variable in this species. Sometimes it is interrupted, and the result is an isolated postorbital spot.

Similar species

- *Trachemys venusta* has a narrow, yellow postorbital stripe that reaches the eye; its first vertebral scale is wider than it is long.
- *Rhinoclemmys funerea* (p. 58) lacks orange or red ocelli in its color pattern, and has a free, fleshy skin flap on each hind foot.
- *Rhinoclemmys pulcherrima* (p. 60) has a similar pattern of red ocelli on the carapace, but it is a mostly terrestrial turtle with a highly domed shell and without webbed feet.

Trachemys venusta

Mesoamerican Slider (*Tortuga Resbaladora*)

Least concern

A large aquatic turtle with a relatively flattened shell and fully webbed feet. Juveniles have a single, low median keel that disappears with age. Carapace has orange or red circles with dark centers. Limbs, neck, and head greenish or gray, with prominent yellow stripes. Postorbital stripe relatively thin and straight; it comes into contact with eyes. Carapace length to 18.9 in (48 cm) in adult females; males considerably smaller.

Trachemys venusta ranges from northern Mexico (on the Atlantic slope) and from southwestern Costa Rica (on the Pacific slope) southward into Colombia. In Costa Rica, it occurs in rivers throughout the Atlantic coastal plain, as well as on the Pacific coastal plain of the Golfo Dulce and Osa Peninsula; from near sea level to 200 ft (60 m).

Natural history

Trachemys venusta is a large turtle. With its flipper-like webbed feet and smooth, streamlined carapace, it is well-adapted to an aquatic lifestyle. Individuals can be observed as they swim in lowland rivers throughout their range, but most often they are seen basking on sandbanks and logs just above the water level. Even though these animals are usually seen on sunny mornings, their main activity period is at night.

Research on Panamanian populations of *Trachemys venusta* showed that reproduction takes place mainly in the dry season (December to May). Courtship and mating take place in the water. Females create a flask-shaped nest chamber in a dry, sun-exposed area, into which 9–35 elliptical, leathery eggs are deposited. *Trachemys venusta* nests are not always located near water, and they have been found up to a mile (1.6 km) from the nearest river. Females may produce multiple clutches every year; clutch size is positively correlated with the size of the female.

The eggs hatch after 2–2.5 months, but the hatchling turtles may stay inside the nest until the rainy season commences (usually May or June). Hatchlings are known to spend up to 2 months inside the nest chamber after hatching. Juveniles require 5–7 years to reach sexual maturity. The gender of hatchlings is determined by the incubation temperature of the eggs. High incubation temperatures will result in offspring that are all females, while lower temperatures predominantly produce males.

Juveniles are mainly carnivorous and eat a wide variety of animal prey, including aquatic insects, crustaceans, mollusks, tadpoles, and fish.

These turtles are most frequently observed as they surface, with only their head visible. The yellow postorbital stripe that connects with the eye is a diagnostic feature.

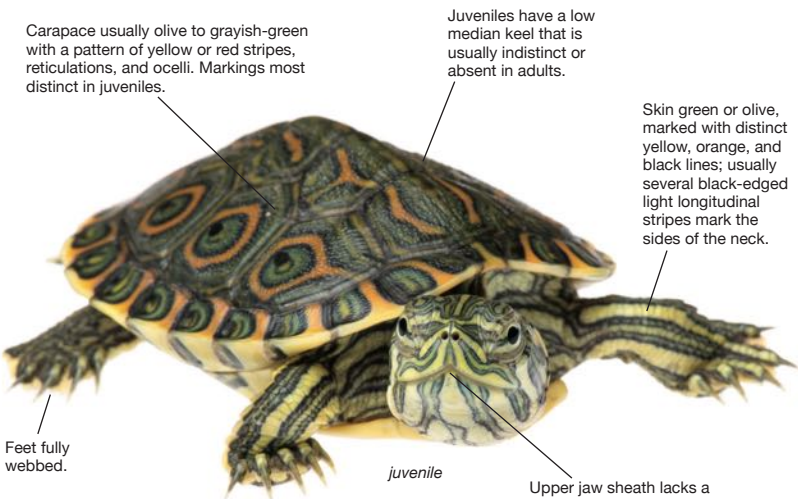
Contrasting markings on carapace darken with age, sometimes becoming difficult to discern in large adults.

As they mature, their diet becomes increasingly vegetarian.

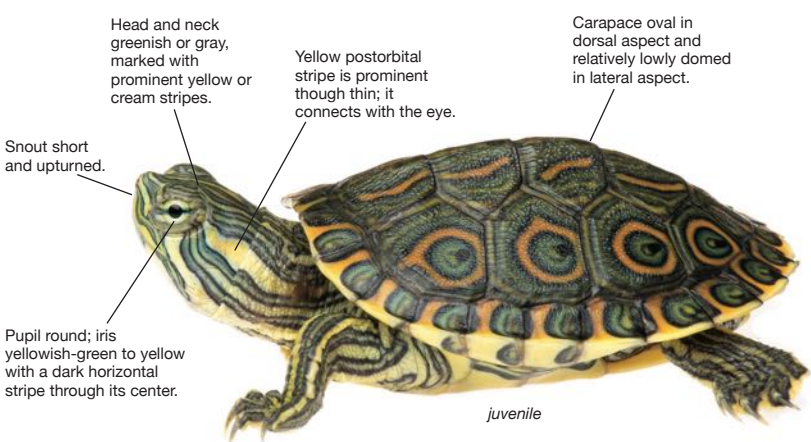
Many mammals, birds, and reptiles are known to prey on the eggs and juveniles of this species, but large adults have few predators except for humans, crocodilians, and, possibly, large cats. Although common to abundant locally, *Trachemys venusta* suffers tremendously from hunting and collecting by humans in many parts of its range, and it is sometimes absent from seemingly suitable areas because of excessive harvesting. Eggs are collected for consumption, and adult turtles are hunted for their meat and shells.

The taxonomic history of this species is complex and confusing, and it appears in older literature under a variety of names, including *Trachemys scripta*, *Pseudemys scripta*, *Chrysemys scripta,* and *Chrysemys ornata.*

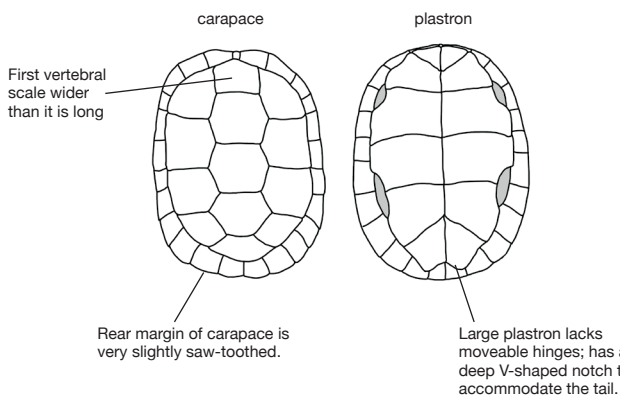
Description



juvenile



juvenile



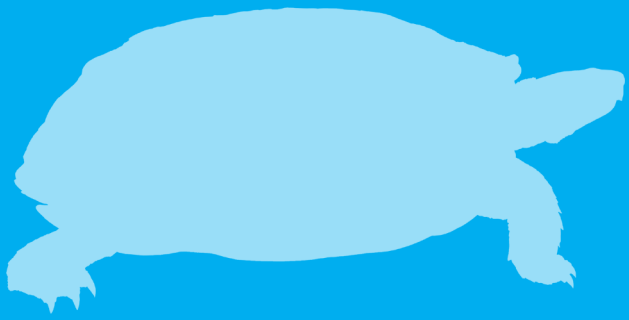
Similar species

- *Trachemys emolli* (p. 49) has a broad yellow or orange postorbital stripe that does not come into contact with the eye; its first vertebral scale is longer than it is wide.
- *Rhinoclemmys funerea* (p. 58) lacks orange or red ocelli and has a free, fleshy skin flap on each hind foot.
- *Rhinoclemmys pulcherrima* (p. 60) has a similar pattern of red ocelli on the carapace, but it is a mostly terrestrial turtle with a highly domed shell and without webbed feet.

Family Geoemydidae
(Neotropical Wood Turtles and Asian Box Turtles)

This family of predominantly Old World species contains 71 species in 19 genera; the 9 species of *Rhinoclemmys* are the only members of this family found in the New World tropics. All of these turtles are semi-aquatic, but there is considerable difference in the degree to which they spend time in the water, even among the three Costa Rican species of *Rhinoclemmys*.

Members of this family can be identified by the plastron, which lacks a moveable hinge and is generally large and not cross-shaped; the plastron is formed by 12 plates. In addition, all species in this family have flat, paddle-shaped (to varying degrees) feet with well-defined digits, and usually some webbing between the toes. Several of the more aquatic forms sometimes have fully webbed feet. These turtles are not easily differentiated from the members of the family Emydidae; recent taxonomic revisions separated both families based on skeletal features, but externally they are quite similar in overall morphology.



Rhinoclemmys annulata

Brown Wood Turtle (*Tortuga del Bosque*)

Least concern

A medium-sized, terrestrial turtle with a uniformly brown carapace that bears a single, median keel. There are no moveable hinges in its plastron. Posterior edge of carapace slightly saw-toothed. Carapace length to 7.9 in (20 cm).

Rhinoclemmys annulata occurs in the Atlantic lowlands and foothills of southern Honduras, Nicaragua, Costa Rica, and Panama, and crosses onto the Pacific slope in eastern Panama, western Colombia, and northern Ecuador; from near sea level to 2950 ft (900 m).

Natural history

Rhinoclemmys annulata is an inhabitant of pristine lowland and foothill forests. It is diurnal and most often seen during the morning hours, with increased activity after heavy rains. This turtle feeds on plants, fruits, seedlings, and shoots, but seems to prefer ferns. Because of its habit of eating seeds and fruits, *Rhinoclemmys annulata* may be a significant seed disperser within its home range. Limited observations indicate that these turtles spend a lot of time in a relatively small area.

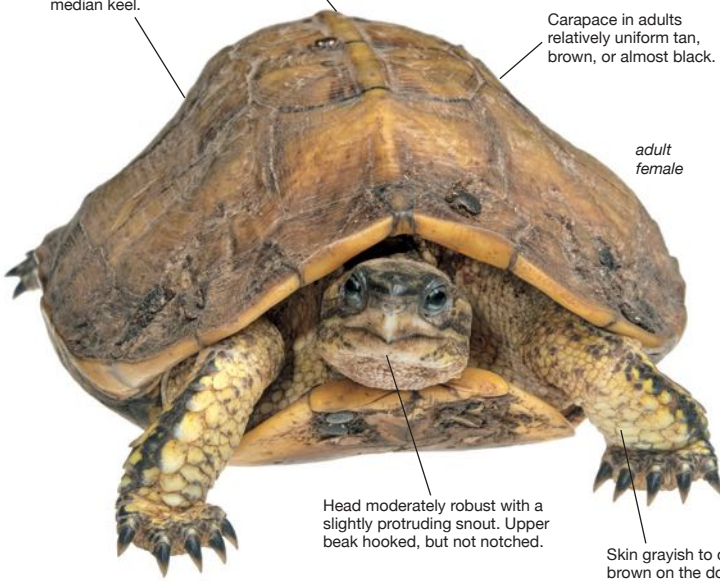
Its coloration allows it to blend in well among the leaves and vegetation on the forest floor, and when not moving these turtles easily escape detection. Although generally seen on land, *Rhinoclemmys annulata* readily takes to the water when it needs to cool off. During periods of inactivity, it seeks refuge from the heat and predators in the leaf litter or beneath the root systems of trees. Courtship and mating take place on land. Females often end up with bite injuries to the neck and damaged scutes on the carapace near the head as males use their claws and mouth to hold on to the female during mating. Females lay 1 or 2 eggs at a time, generally in a shallow depression in the forest floor or simply hidden in the leaf litter. Oviposition apparently takes place year-round.

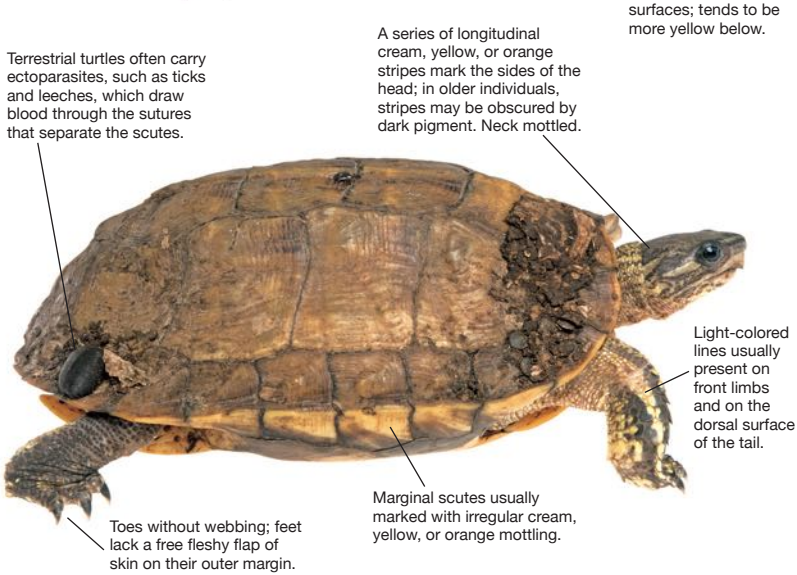
Most individuals are infested with ectoparasites, predominantly ticks and leeches that attach themselves to the sutures between scutes of the shell, where it is easier to tap into the turtle's blood stream. Generally, these parasites are located on the posterior half of the shell, where they cannot be rubbed off as the turtle squeezes underneath branches and vegetation. Some of these parasites may be attached for a considerable amount of time.

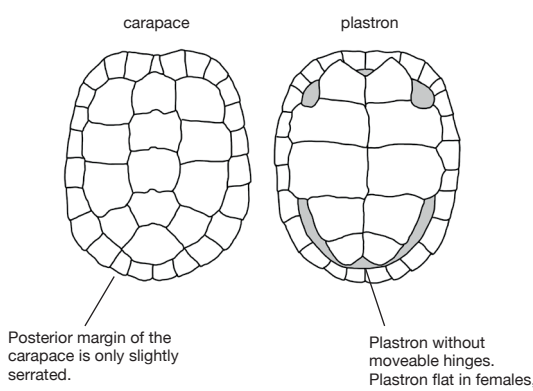
Juveniles have a markedly pronounced median keel on their carapace. (Note the attached tick.)

Description

Males have a long tail; the cloacal opening is located beyond the margin of the shell. Females have a shorter tail, with vent located at the tail base, within the margin of the shell.







Similar species

- *Rhinoclemmys funerea* (p. 58) is more aquatic. It has webbed feet and a distinct flap of loose skin on the outer margin of each foot.
- *Rhinoclemmys pulcherrima* (p. 60) has bold black, yellow, and red markings on its shell.
- *Kinosternon* species (pp. 63–69) have moveable hinges in their plastron and can close their shell.
- *Trachemys* species (pp. 49–53) are much larger and more aquatic, with fully webbed feet.

Rhinoclemmys funerea

Least concern

Black Wood Turtle (*Tortuga Negra*)

A fairly large aquatic turtle with a highly domed, smooth carapace that bears a single median keel. Shell nearly uniform in color, dark brown to black; skin black with yellow spots and stripes. Feet almost completely webbed; has a unique free flap of fleshy skin on the outer margin of each foot. Length of carapace to 14.6 in (37 cm).

Rhinoclemmys funerea occurs throughout the Atlantic lowlands, from extreme southern Honduras southward through Nicaragua, Costa Rica, and to the Canal Zone in Panama; from near sea level to 1970 ft (600 m).

Natural history

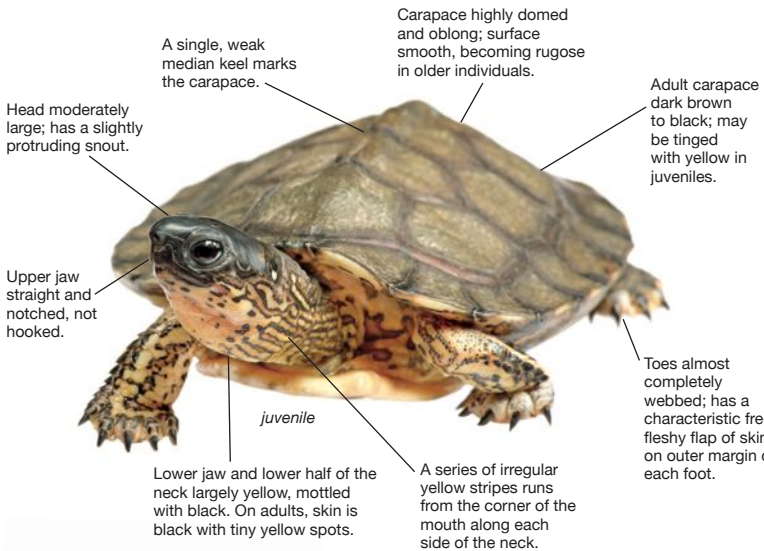
Rhinoclemmys funerea is a semi-aquatic turtle, closely associated with freshwater habitats such as slow-moving rivers and swamps. These turtles are frequently seen basking on logs and sandbars, or when swimming in the shallows of rivers during the day. This is the most commonly seen basking turtle in much of the Atlantic lowlands, especially in the canals surrounding Tortuguero. It is a very shy species and, when approached too closely, it dives into the water and remains submerged for several minutes, surfacing in a different spot. At night, *Rhinoclemmys funerea* can be found on land, sometimes a considerable distance from water. It actively searches for grasses, leaves, and fruits on its nocturnal forays, and some authors regard *Rhinoclemmys funerea* as an important disperser of plant seeds along water courses.

Both sexes reach sexual maturity when their carapace reaches approximately 8 in (20 cm) in length. Mating is preceded by a courtship in which a swimming female is chased by the male. At some point, the female slows down or stops, and the male comes alongside her, extending and rapidly vibrating his head and neck. Reproduction takes place toward the end of the dry season or at the beginning of the rainy season (March through August). Between 1–4 clutches are produced, each containing three eggs on average. The eggs are placed on the ground and covered with leaves—no nest is dug. Juveniles hatch 3–3.5 months after the eggs are laid.

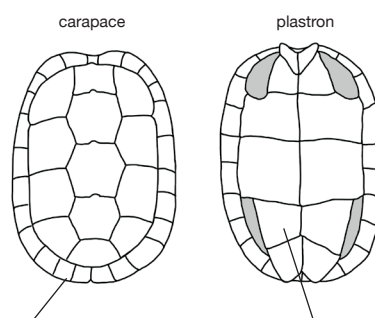
Juveniles and eggs of this species are subject to predation by a variety of animals, including snakes, crocodilians, raptors, and wading birds, as well as mammals who dig up their nests (e.g., raccoons and coyotes). Large adults are protected by their hard shell, but occasionally fall prey to larger mammals and crocodilians.

Rhinoclemmys funerea is the most aquatic of the three Costa Rican species in this genus. Its habits are similar to those of the sliders in the genus *Trachemys*, and all are often seen basking and swimming in the same rivers.

Description



Females with a short tail; vent located on the tail base within the margin of the shell. Male's cloacal opening located beyond the margin of the carapace.



Posterior margin of shell serrated in juveniles, notched in adults.

Plastron lacks moveable hinges. Plastron flat in females, concave in males.

Similar species

- *Rhinoclemmys annulata* (p. 55) is more terrestrial. It lacks webbing and a fleshy flap of skin on its feet.
- *Rhinoclemmys pulcherrima* (p. 60) is mostly terrestrial, and has bold black, yellow, and red markings on its shell.
- *Kinosternon* species (pp. 63–69) have moveable hinges in their plastron and can close their shell.
- *Trachemys* species (pp. 49–53) have a complex pattern of thin light lines on the head and neck, while the carapace and plastron are marked with concentric circular markings.

Rhinoclemmys pulcherrima

Ornate Wood Turtle (*Tortuga Roja*)

Vulnerable

A medium-sized turtle with a highly domed, smooth carapace that bears a single median keel. Spectacularly patterned, with greenish, gray, red, and yellow stripes and ocelli on the head, neck, and the underside of its marginal scales. Carapace length to 7.9 in (20 cm) in females; to 6.3 in (16 cm) in males.

Rhinoclemmys pulcherrima occurs along the Pacific slope from Sonora, Mexico, southward to northwestern Costa Rica, and locally on the Atlantic slope in Honduras and Guatemala; from near sea level to 3800 ft (1160 m).

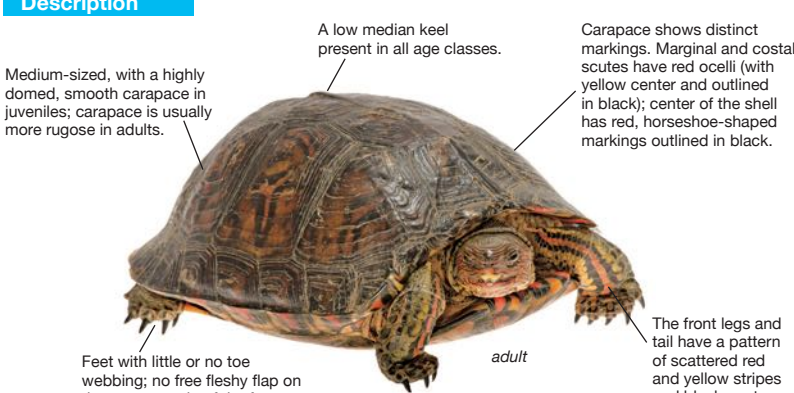
Natural history

Rhinoclemmys pulcherrima is a primarily terrestrial species of relatively dry habitat types. In Costa Rica, it is most commonly found in the gallery forests that line water courses throughout the Pacific northwest. Although mostly seen on land, it readily takes to the water during dry spells. This turtle is predominantly active during the day, but in the peak of the dry season activity may be restricted to the cooler dusk and dawn periods.

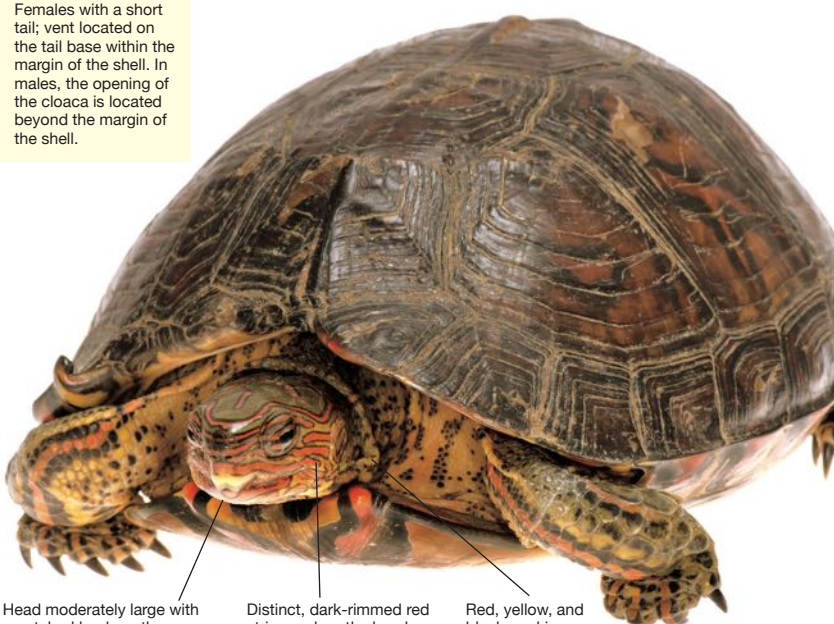
Females lay 1–3 eggs in a nest they excavate; nests are generally located in soft soil at the base of clumps of grass or between the roots of shrubs. The nest cavity is about 4-in (10-cm) deep and is backfilled after the eggs are laid. The female compacts the dirt with her hind limbs, or pats it down with her entire body, and usually brushes leaves and debris over the top of the nest to cover up traces of her activity. Eggs are laid mainly in the rainy season, between May and December.

Rhinoclemmys pulcherrima is mostly vegetarian, consuming plants, fruits, seeds, and flowers, but will on occasion take worms, grubs, and other soft-bodied invertebrate prey. In turn, these turtles are preyed upon by birds of prey, herons, and egrets, as well as larger mammals and crocodilians. Predation rates on eggs and juveniles are significantly higher than on adults. This species is popular in the pet trade, both locally and internationally.

Description



Females with a short tail; vent located on the tail base within the margin of the shell. In males, the opening of the cloaca is located beyond the margin of the shell.



Head moderately large with a notched beak on the upper jaw, often with a pointed cusp on either side of the notch.

Distinct, dark-rimmed red stripes adorn the head.

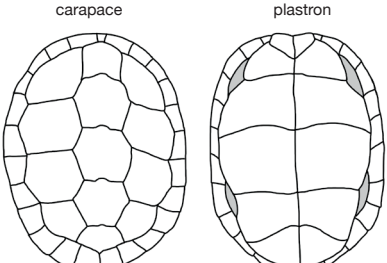
Red, yellow, and black markings or ocelli may be present on the neck.

Underside of the marginal scales boldly marked with black and red ocelli.

Plastron pale yellow; dark markings restricted to a narrow dark longitudinal stripe on each bridge and a dark gray central area.

carapace

plastron



Juveniles with a serrated posterior shell margin; gradually becomes more rounded or notched in adults.

No hinges in plastron. Female plastron flat; male has a concave plastron.

Similar species

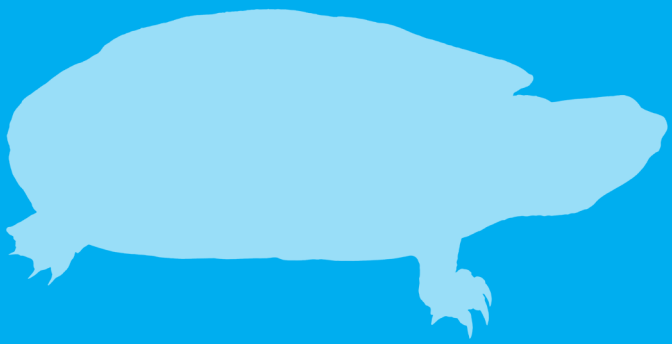
- *Rhinoclemmys anulata* (p. 55) lacks red and yellow ocelli, stripes, and spots.
- Juveniles of *Trachemys* species (pp. 49–53) can have distinct red ocelli on the plastron, and red and yellow markings on the head and neck, but usually have a green dorsum; juveniles and adults are aquatic and invariably have webbed feet.

Family Kinosternidae
(Mud Turtles)

Members of the family Kinosternidae range widely throughout the Americas, from the United States through Mexico and Central America, and into South America as far south as Bolivia and Argentina. Most mud turtles are small, usually with a carapace length of 6–8 in (15-20 cm), but some species can grow considerably larger. This family is comprised of 26 species in 4 genera (*Claudius, Kinosternon*, *Staurotypus*, and *Sternotherus*). Costa Rica is home to 3 species of *Kinosternon*.

All Costa Rican mud turtles can be recognized by having two moveable hinges across the plastron that allow for the anterior and posterior plastral lobes to be closed. Some species are able to completely or almost completely close the shell, whereas in others much of the soft body parts remain exposed at all times. Mud turtles typically have a highly domed shell, often with one or more faint keels, and also have prominent barbels on the chin.

All mud turtles are aquatic to varying degrees and inhabit shallow bodies of stagnant or slow-moving water. Favored wetlands contain dense aquatic vegetation and have a soft bottom. Poor swimmers, these turtles move around mostly by walking on the bottom, feeding on small animals, carrion, and occasionally vegetable matter. Individuals are sometimes encountered on land, considerable distances from water, either moving from one wetland to another, or looking for a suitable spot to lay their eggs.



Kinosternon angustipons

Data deficient

Narrow-bridged Mud Turtle (*Tortuga Enano*)

A small turtle with two moveable hinges in the plastron and an upper beak that is not hooked. Its plastron is reduced in size and much of the soft tissue is exposed when the shell is closed. Carapace length to 4.7 in (12 cm) in females, slightly less in males.

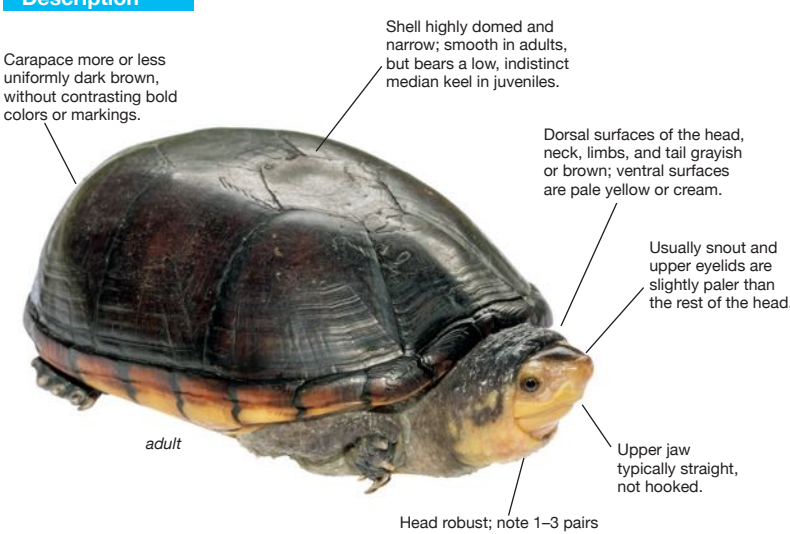
Kinosternon angustipons occurs in isolated populations, from extreme southern Nicaragua, along the Atlantic lowlands to northwestern Panama; from near sea level to 850 ft (260 m).

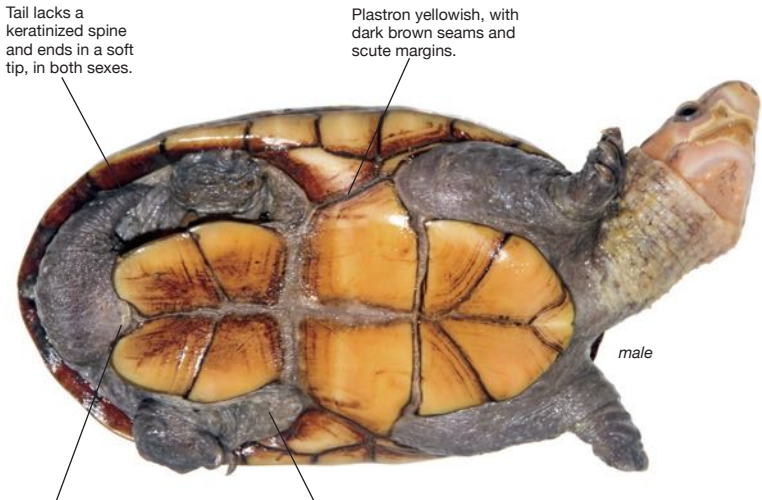
Natural history

This rare species is known from only a few individuals, and its biology is poorly known. *Kinosternon angustipons* inhabits shallow permanent swamps and slow-moving backwaters in the Atlantic coastal plain. It seems to prefer aquatic habitats that are choked with algae or vegetation and feeds primarily on plant matter. On occasion, it will prey on soft-bodied invertebrates, and possibly tadpoles, frogs, and fish.

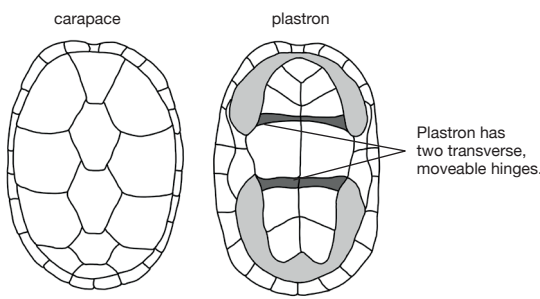
Reproduction may peak between May and August, but examination of preserved specimens indicates that the breeding season is drawn out, possibly occurring year-round. This species probably produces small clutches, possibly only a single egg at a time, but lays eggs several times per breeding season.

Description





Males with a long tail that extends well beyond the posterior margin of the carapace; female tail short, barely reaching the carapace margin.



Similar species

- *Kinosternon leucostomum* and *K. scorpioides* (p. 67) also have two moveable hinges in the plastron but have almost no soft tissue exposed when the plastron is closed.
- *Chelydra acutirostris* (p. 45) has a reduced, but unhinged, plastron. It grows much bigger and has a very long tail.

Kinosternon leucostomum

White-lipped Mud Turtle (*Tortuga Amarilla*)

Least concern

A medium-sized turtle with two moveable hinges in its plastron, allowing it to completely seal itself within the shell. Typically has pale jaw sheaths and yellow stripes or spots on its dark brown head and neck. Carapace highly domed, without keels (an indistinct median keel may be present in very small juveniles). Carapace length to 6.7 in (17 cm) in males, and 6.3 in (16 cm) in females.

Kinosternon leucostomum ranges throughout the lowlands and foothills of the Atlantic slope, from Mexico to northern Colombia; on the Pacific slope, it occurs from central Costa Rica to western Ecuador. From near sea level to 4920 ft (1500 m).

Natural history

A semi-aquatic turtle found in relatively undisturbed wet forests; it also occurs in some streams in lowland dry forests of central Costa Rica. *Kinosternon leucostomum* is usually seen in or near streams, marshes, ponds, wet meadows, or even water-filled tire ruts in forest roads. Individuals do occasionally wander some distance from the nearest body of water.

Kinosternon leucostomum is predominantly nocturnal. It walks along the bottom of streams and ponds at night in search of food; during the day it hides while buried in loose sediment. These turtles are omnivorous and eat plant matter, algae, seeds, and sometimes small invertebrates. There are several records of individuals feeding on carrion, and this species seems highly opportunistic.

Reproductive activity peaks twice yearly, in April as well as in July. Mating takes place in shallow water after an elaborate courtship. Small clutches of 1–5 oblong hard-shelled eggs are usually deposited in July and October. The female does not excavate a nest cavity, but rather deposits her eggs in a shallow depression covered with leaf litter. Hatchlings are tiny, with a carapace length of about one inch (2.5 cm), and inhabit very shallow pools or flooded meadows. The sex of the offspring is determined by the incubation temperature during a thermosensitive period in embryonic development. Generally higher temperatures lead to a higher proportion of female offspring.

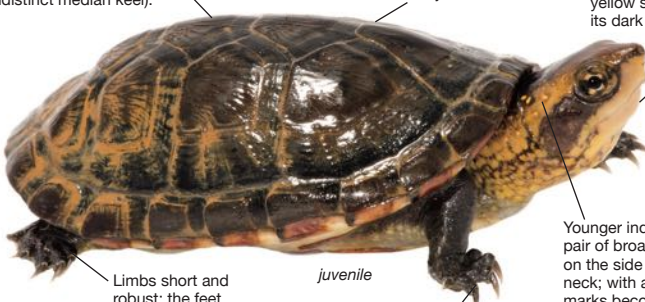
Of all Costa Rican turtles, *Kinosternon leucostomum* is best able to completely withdraw inside its shell. The hinged plastron allows for the armored shell to be completely sealed with all soft body parts safely inside.

Description

Small to medium-sized, with a smooth, highly domed carapace (small juveniles have an indistinct median keel).

Carapace dark brown to nearly black.

Typically has cream to yellowish, unmarked jaw sheaths and a pattern of yellow stripes or spots on its dark brown head.

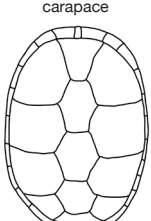


Limbs short and robust; the feet are webbed.

Limbs and tail uniformly grayish-brown.

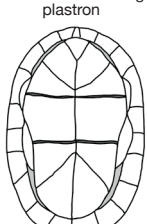
Younger individuals have a pair of broad, yellow stripes on the side of the head and neck; with age, these yellow marks become suffused with dark pigment and are reduced to a scattering of smallish yellow spots.

carapace



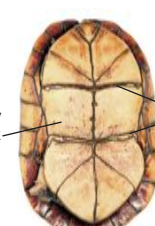
Posterior edge of carapace rounded.

plastron



The moveable anterior and posterior lobes can be raised to close the shell, leaving no soft parts exposed.

Plastron yellow, sometimes heavily suffused with dark pigment.



Plastron with two hinges; not notched posteriorly.

Similar species

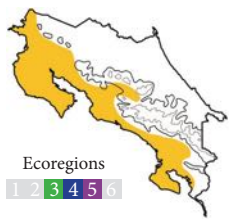
- *Kinosternon angustipons* (p. 63) has a reduced plastron and lacks a hook on its upper jaw.
- *Kinosternon scorpioides* usually has three low, median keels on its carapace.
- *Rhinoclemmys annulata* (p. 55) lacks moveable hinges in its plastron, and its carapace has a weakly serrated posterior margin.

Kinosternon scorpioides

Least concern

Scorpion Mud Turtle (*Tortuga Candado*)

A medium-sized turtle. The two moveable hinges in its plastron allow it to completely seal in all soft tissues when closing its shell. Carapace is highly domed but relatively flat-topped; typically has two or three indistinct median keels. Carapace length to 6.7 in (17 cm) in both sexes.



Kinosternon scorpioides has a very large distribution range, extending from northern Mexico through Central America and into South America as far south as central Brazil and northern Argentina. Although it occurs along both slopes elsewhere, it is absent on the Atlantic slope of Costa Rica, except locally on the Atlantic side of the Central Valley. From near sea level to at least 4595 ft (1400 m).

Natural history

This is a relatively common semi-aquatic turtle that inhabits marshes and other stagnant bodies of water, although it is sometimes found in slow-moving sections of large rivers, or even streams. *Kinosternon scorpioides* is more tolerant of habitat alteration than other species of *Kinosternon*, and may occur in man-made ponds in close proximity to human settlements. It sometimes occurs in surprisingly high densities. Although mostly aquatic, occasionally these turtles wander onto land and are found at a considerable distance from the nearest aquatic habitat. This is especially true in the dry season, when ponds and marshes dry up and turtles leave to find a suitable aquatic habitat that will allow them to survive until the rainy season. If no water is available nearby, *Kinosternon scorpioides* can survive unfavorably dry conditions by burying into the mud, awaiting the next rainy spell. Nevertheless, severe and prolonged droughts may result in death through dehydration or starvation.

Unlike most other species in the genus, *Kinosternon scorpioides* is primarily carnivorous. It feeds mainly on aquatic invertebrates, but will opportunistically take fish or amphibians as well. Individuals have been observed scavenging carrion.

Like *Kinosternon leucostomum*, this species has two mating seasons each year, centered on January and July. It has an elaborate courtship, and a male and female interact for a prolonged period of time before mating. Females lay 1–6 somewhat elliptical, hard-shelled eggs in a shallow, depression-like nest that is often excavated between the roots of a clump of vegetation. The nest is generally located close to the water's edge but is sometimes placed some distance from water. The incubation period of the eggs is about 4 months.

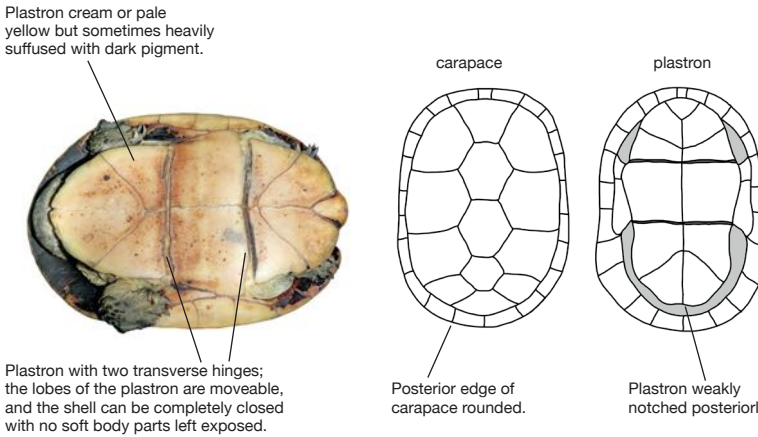
Like other turtles, *Kinosternon scorpioides* is preyed upon regularly by coyotes and larger cats. Their eggs and juveniles are particularly vulnerable to predation by snakes, birds, mammals, and crocodilians. Due to their preference for seasonally dry habitats, many of these turtles succumb to the effects of naturally occurring brush fires and man-made fires on agricultural lands. Of the 164 dead individuals examined in a one-year study at Palo Verde National Park in northwestern Costa Rica, 140 had died during a three-day fire. The remaining 24 died of other causes during the rest of the year. Juvenile *Kinosternon scorpioides* seem to be particularly affected by fires, and the annual burning of cultivated lands in much of Latin America seriously endangers local populations of this species.

Description

Carapace marked with two or three indistinct median keels. Juveniles have three distinct keels, but the median keel usually disappears with age, leaving the carapace somewhat flat-topped.

Tail ends in a distinct keratinized terminal spine in both sexes (hence its common name).

Males have a slightly concave plastron, and a long tail that extends well beyond the posterior margin of the carapace; female's tail short, barely reaching edge of carapace.



Similar species

- *Kinosternon leucostomum* (p. 65) has a smooth carapace without keels (or just a single keel in small juveniles).
- *Rhinoclemmys annulata* (p. 55) lacks hinges in its plastron and the posterior margin of its carapace is weakly serrated.
- *Rhinoclemmys pulcherrima* (p. 60) lacks hinges in its plastron and has a boldly colored shell.

Lizards and Snakes
(Order Squamata)

Lizards, snakes, and a third group not found in Costa Rica, the worm-lizards (Amphisbaenia), make up the order Squamata. It represents the largest order of reptiles, and is the second largest order of any vertebrate animals (only perchlike fish form a larger order). There are roughly 3700 species of snake and more than 6500 species of lizard; they occur throughout the world, except on some islands and in colder latitudes (although some species do enter the Arctic Circle).

Members of the order Squamata are an extremely diverse bunch, ranging in size from dwarf geckos measuring a mere 0.6 in (16 mm) as adults to giant snakes such as pythons and anacondas, which can exceed 20 ft (6 m) in length. Lizards display a dazzling array of body types, and many snakes and lizards rival tropical fish and tropical birds in the brilliance of their spectacular coloration. There are two key characteristics that unite these varied organisms:

- All squamates have keratinized scales or plates on their skin. These scales are regularly regenerated through shedding; lizards shed their skin in patches, while snakes shed their entire skin in one piece.

- All squamates have uniquely jointed jaw and skull bones, allowing for extraordinary mobility. These adaptations are particularly noticeable in snakes, which can open their mouth to an extreme degree to accommodate large prey.

It may seem strange that lizards and snakes are grouped together in a single order, but fossil evidence indicates that snakes evolved from specific groups of burrowing lizards, possibly related to modern day monitor lizards. Early snake fossils show the presence of a pair of reduced limbs, and evidence of this ancestry can still be seen in some primitive snakes such as boids (family Boidae), burrowing pythons (family Loxocemidae), and bromeliad boas (family Ungaliophiidae). Close examination of the tail base of a *Boa imperator*, for example, will reveal vestigial remains of a pelvic girdle and hind limbs, now reduced to a pair of spurs.

There are currently 88 species of lizard and 141 species of snake known to occur in Costa Rica.

Suborder Lacertilia (Lizards)

Lizards are a successful, diverse group of reptiles. Currently, 6512 species are recognized and these live in a wide variety of habitats and climates. They can be found in hot, humid tropical rainforests; bone-dry deserts; marine environments; and, in a few instances, even within the Arctic Circle. Most species are terrestrial, but some climb trees, burrow, or even live in the water. While the great majority are small to medium-sized, some species reach impressive sizes. The largest contemporary lizard, by far, is the Komodo dragon, which can reach a total length of greater than 11 ft (3.3 m), weigh more than 360 lbs (165 kg), and take down prey the size of a water buffalo. Costa Rica's largest lizard, the green iguana (*Iguana iguana*), grows to about 6 ft (2 m), but it is vegetarian. In general, most lizards are carnivores that feed on live prey (insects, other invertebrates, and small vertebrates); some eat carrion and a relatively small number of species eat fruits and vegetables.

Lizards use all senses to detect and capture prey, but they primarily rely on vision and chemoreception. Depending on the species and its diet preferences, the lizard's forked tongue, which plays an important role in detecting chemical cues in the environment, varies greatly in shape. Prey is usually caught after a quick dash, and crushed to death with the lizard's strong jaws. Only two species of lizard, the Gila monster (*Heloderma suspectum*) and the Mexican beaded lizard (*Heloderma horridum*), are venomous and capable of immobilizing prey using toxins. Apart from these two species, the Komodo dragon is the only other lizard in the world that can pose a danger to humans. Nearly all lizards, therefore, including every Costa Rican species, are harmless.

Most lizard species will either attempt to hide (often relying on camouflage) or escape from an approaching human. If captured, many lizards are capable of autotomy, a defense strategy in which a lizard volitionally breaks off

its tail to escape predation. Often, the discarded tail wiggles vigorously, thus attracting the attention of the predator and allowing the lizard to escape. In time a new tail grows back; this replacement tail lacks the original vertebrae, which are replaced by a cartilaginous rod in the new appendage. Although autotomy is a useful defense mechanism, it does negatively affect a lizard's agility, since the loss of a tail also means the loss of the counter balance it provides. More important in the longer term, the energy expended in creating the new tail is not available for other important activities such as searching for food or mates. In some lizards, such as geckos, energy reserves in the form of fat are stored in the tail; thus, while losing a tail today may ensure the short-term survival of a lizard, it may also decrease the chances for survival in the long-term.

Costa Rica is home to 88 species of lizard in 15 families. Lizards can be abundant in almost every part of the country. But in general, the density and diversity of lizards in Costa Rica is higher along the coastal plains and in the lowlands; far fewer species occur at middle and high elevations because of the colder prevailing climate. Nevertheless, one species, *Mesaspis monticola*, can be found near the summits of some of the highest peaks in the country, as high as 12,500 ft (3800 m) above sea level.

Costa Rica's lizard fauna is quite diverse. To help make sense of such diversity, lizard families are often placed within infraorders, a higher taxonomic ranking than that of family.

TABLE 1. Taxonomic overview of Costa Rican lizards

	Common name	No. of species
Infraorder Diploglossa		
Family Anguidae	Alligator and glass lizards	2
Family Diploglossidae	Galliwasps	5
Infraorder Gekkota		
Family Eublepharidae	Eyelid geckos	1
Family Gekkonidae	Typical geckos	4
Family Phyllodactylidae	Leaf-toed geckos	2
Family Sphaerodactylidae	Dwarf geckos	6
Infraorder Iguania		
Family Corytophanidae	Casque-headed lizards	4
Family Dactyloidae	Anoles	38
Family Iguanidae	Iguanas	3
Family Phrynosomatidae	Spiny lizards	3
Family Polychrotidae	Bush anoles	1
Infraorder Scincomorpha		
Family Scincidae	Skinks	5
Family Gymnophthalmidae	Micro-teiids	6
Family Teiidae	Whiptail lizards	6
Family Xantusiidae	Night lizards	2

In order to identify a lizard, it is important to note its scalation characteristics; these are illustrated and described in detail in the species accounts. The size and shape of the scales on a lizard's body and head are keys to placing them in a given infraorder or family. Scalation characteristics can also indicate the habitat or lifestyle of a lizard. For example, the body and head of skinks, which are covered with similarly-sized, small, very smooth scales, are perfectly adapted for slipping through small openings without creating much friction. This is ideal for a lizard that spends its time moving through dense leaf litter on the forest floor. Iguanids, to give another example, have rough scales that help them grip the trees they climb. To place a Costa Rican lizard in the proper infraorder, note the following scalation characteristics:

Infraorder Diploglossa

Body, limbs, and tail covered with rounded, overlapping, cycloid scales; scales shiny and striated (marked with minute parallel ridges). Head covered with enlarged smooth plates. Some species have a lateral skin fold on each side of the body, between their limbs.

Infraorder Gekkota

Head, body, and tail covered with non-overlapping, minute, granular scales. They lack enlarged plates on the head. Most species lack moveable eyelids.

Infraorder Iguania

Scales on body and tail variable, ranging from granular to spiny, but never rounded and cycloid. Head invariably covered with large, symmetrical plates. Many species have enlarged or spine-like scales along the dorsal midline.

Infraorder Scincomorpha

Contains a very diverse group of families with variable scalation characteristics. All have enlarged, symmetrical plates on the head. This infraorder includes all lizards with square ventral scales; all lizards whose scales completely encircle the body in uninterrupted whorls; and all lizards with overlapping, cycloid scales that are smooth or keeled (not striated). It also includes lizards with granular scales on the body that are interspersed with pointed tubercles.

Fig. 1. Types of scales found in Costa Rican lizard species.

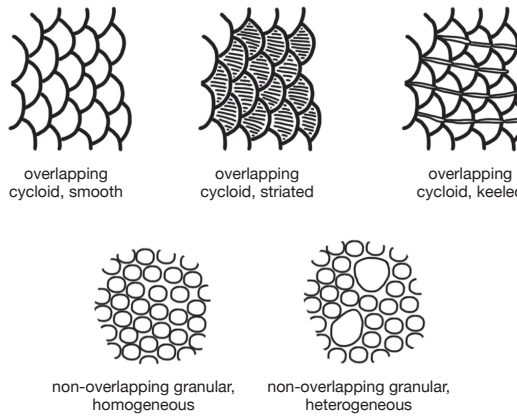
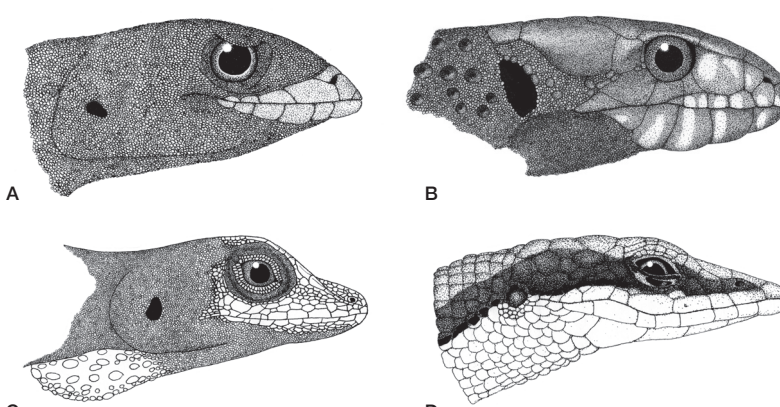


Fig. 2. Examples of scale arrangements in lizards.



A. Homogeneous granular scales on head and body; no enlarged plates covering top of head (*Lepidoblepharis xanthostigma*, family Sphaerodactylidae). **B.** Heterogeneous granular scales on body, interspersed with enlarged tubercles; head heavily armored with large, smooth plates (*Lepidophyma flavimaculata*, family Xantusiidae). **C.** Small granular or slightly overlapping cycloid scales on body; head with enlarged scales (*Anolis lemurinus*, family Dactyloidae). **D.** Dorsum covered with squarish scales in continuous whorls; throat with overlapping cycloid scales; and head entirely covered with smooth, enlarged plates (*Anadia ocellata*, family Gymnophthalmidae).

Infraorder Diploglossa (Families Anguidae and Diploglossidae)

Sometimes referred to as infraorder Anguimorpha (meaning "eel-shaped ones"), this is a taxonomically confusing group of elongate, short-legged lizards. Morphologically, they are superficially similar to some members of the infraorder Scincomorpha, most notably skinks (family Scincidae) and some micro-teiids (family Gymnophthalmidae), and are thus easily confused.

It should be noted that most members of this infraorder are rarely seen, either because of their habits (spending considerable time underground or possibly in the forest canopy) or because of their limited geographic range. Skinks, however, are common inhabitants of many lowland habitats and are often prominently visible as they bask in sunny areas or dart across open expanses between vegetation.

Infraorder Diploglossa at a Glance

All Costa Rican members have well-developed limbs, a cylindrical body, and a robust tail; the head is relatively large and covered with enlarged smooth plates. The eyelids are moveable; the eyes have a round pupil. The external ear opening is clearly visible. Body, limbs, and tail are covered with rounded, overlapping, cycloid scales; each scale has an embedded bony plate (osteoderm) that provides additional armor.

In addition to these characterisitcs, the following characteristics uniquely identify Costa Rican members of the two families in this infraorder:

- **Family Anguidae (p. 78).** A distinct lateral skin fold is present between the point of insertion of the front limbs and hind limbs; appears as a longitudinal groove on the sides of the body. All body and tail scales arranged in continuous whorls that surround the body.

- **Family Diploglossiade (p. 84).** Scales on body and tail striated, each marked with several minute parallel ridges (not a single median keel).

Mesaspis monticola (family Anguidae). Note the lateral skin fold between the limbs.

Diploglossus bilobatus (family Diploglossidae). This lizard is sleek and snake-like.

Family Anguidae
(Alligator Lizards and Glass Lizards)

The 78 members of this family range through regions of North and Central America, Europe, and Asia. All species are elongate and slender and have a long, fragile tail. Costa Rica has two anguid species in two genera: *Gerrhonotus rhombifer* and *Mesaspis monticola*. Although anguid lizards in other parts of the world are sometimes legless, both Costa Rican species have front and hind limbs, each with five digits that bear exposed claws.

All anguids have a small, bony plate called an osteoderm underlying each large body scale. In the aggregate, these plates form a protective, chain-link-like armor. However, they also somewhat limit the ability of the lizard to expand its body when it eats and breathes. The Costa Rican species are immediately recognized by the presence of a lateral skin fold that runs along the body, from the insertion of the forelimbs to the groin. This lateral groove contains expandable skin marked with numerous small scales and separates the enlarged dorsal and ventral scales that contain the osteoderms.

Mesaspis monticola is a common lizard of high elevations and is often the only lizard found above the tree line on some of the higher peaks in Costa Rica, whereas *Gerrhonotus rhombifer* is an exceedingly rare species that is only known from a handful of individuals.

Gerrhonotus rhombifer
Isthmian Alligator Lizard

Data deficient

A slender, arboreal lizard with a lateral skin fold between its front and hind limbs, a broad head, and an extremely long, prehensile tail. Standard length to at least 6.5 in (165 mm); total length to 20.5 in (522 mm).

Gerrhonotus rhombifer is only known from a few isolated locations in southwestern Costa Rica and in adjacent western Panama; from near sea level to almost 3280 ft (1000 m).

Natural history

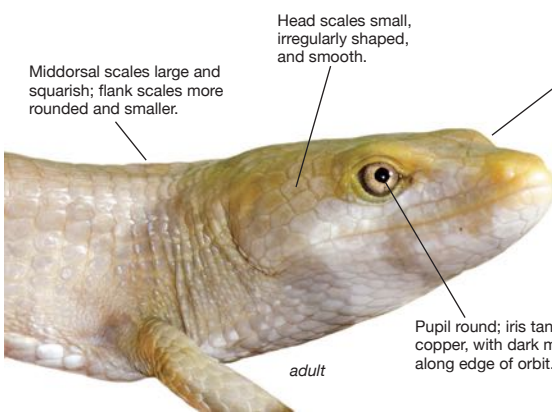
From 1876, when it was first described, to 2013, this lizard was only documented four times. Although additional individuals have been reported since, this remains a rare, enigmatic species. Nevertheless, observations on a captive animal, combined with several new sightings, have resulted in some information on its biology, and it appears that this is predominantly an arboreal canopy-dweller. Its long tail is prehensile, and these lizards have been observed hanging from their tail while foraging during the day. Preferred food items in captivity include large katydids, while other prey items offered (such as small lizards) are consistently ignored. At night, these lizards sleep on branches, with their long tail coiled around the body, much in the way arboreal snakes sleep. Interestingly, the position of the eyes and shape of the head in *Gerrhonotus rhombifer* enable it to look down easily without the need to move its head, likely an adaptation to an arboreal life. These lizards are alert and visually oriented, responding readily to disturbances. When threatened, they are prone to open their mouth in a defensive gape and may bite when pressed too closely.

Observations on a captive individual revealed that it had no interest in tree holes or other enclosed hiding places, nor did it voluntarily descend to the floor of its enclosure. When startled, the lizard would escape by actively launching itself off its perch and engaging in a controlled fall, using the tail to stop itself or change direction. If the animal fell all the way to the ground, it would escape rapidly with snake-like, undulating movements of its body and tail.

Observations in the wild indicate that these lizards may descend from the canopy only to lay eggs at the bottom of a tree. The observation of hatchlings and young juveniles, either on the forest floor or ascending the trunk of large canopy trees, seems to corroborate this assertion.

Until very recently, this species was known as *Coloptychon rhombifer*, and it represented the only species in its genus. However, a study from 2018 found a close relationship with keeled-scaled members of the alligator lizard genus *Gerrhonotus* and included it in that genus. *Gerrhonotus* species are predominantly found in northern Central America and the southern United States.

Description



adult

In juveniles, top of the head yellowish-tan, gray, or pinkish-gray; sides marked with bold black-and-white bars.

Iris black in young individuals; obscured by a dark eye stripe.

juvenile

Tail cylindrical, extremely long (more than twice standard length), and strongly prehensile.

Juveniles with a striking pattern of 20–25 brownish-black and white bands, covering dorsum and flanks on the body and completely encircling the tail.

Subadult color pattern is derived from the bold juvenile pattern, with white bands becoming silver-gray and brownish-black bands turning reddish-brown.

Similar species

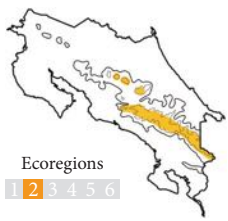
- *Diploglossus monotropis* (p. 95) is similar in size and shape but lacks a lateral skin fold and has a pattern of dark (brown to black) crossbands alternating with bright yellow, orange, or red bands.
- *Mesaspis monticola* (p. 82) has a lateral skin fold between the limbs, but it is a terrestrial highland species.

Mesaspis monticola

Least concern

Highland Alligator Lizard (*Dragón, Dragoncillo*)

The only lizard in the Costa Rican highlands with a well-developed lateral skin fold between its front and hind limbs. Males to 3.5 in (88 mm) in standard length, females to 3.3 in (84 mm); total length to 9.3 in (236 mm).



Mesaspis monticola is restricted to the highlands of the Central and Talamanca mountain ranges in central Costa Rica and adjacent western Panama; from 5900 to 12,500 ft (1800 to 3800 m).

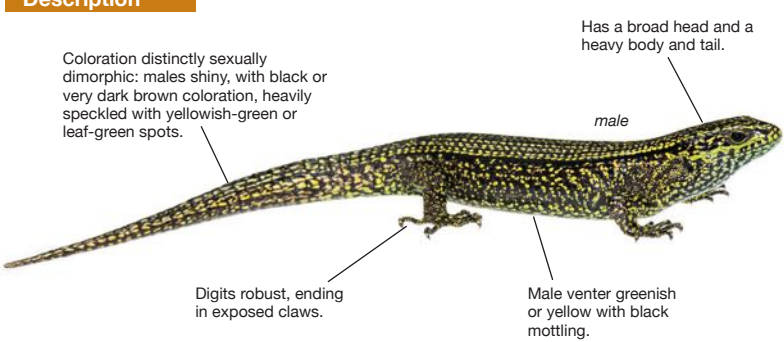
Natural history

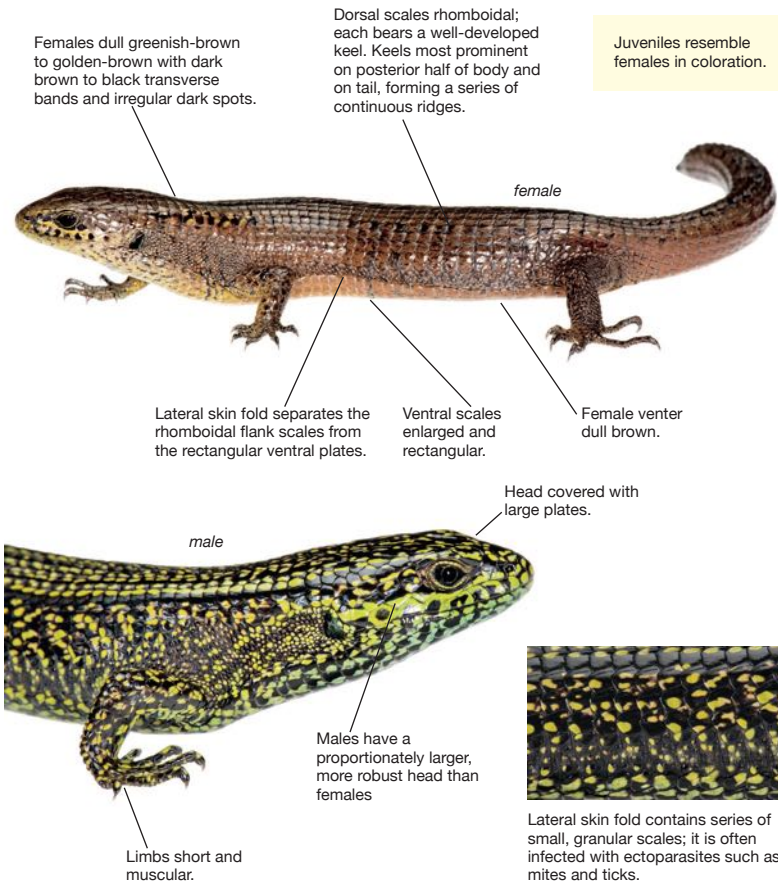
This high elevation lizard—one of the very few in Costa Rica—is fairly common but infrequently observed. Due to low temperatures that prevail throughout its range (temperatures may drop to near freezing at night at the highest altitudes), *Mesaspis monticola* is most active during the warmest hours on sunny days. It can be abundant in relatively open areas with sufficient basking spots, but rainy and windy conditions may keep it hidden from sight for prolonged periods of time. Look for these lizards in areas with low páramo vegetation, where they prefer to bask on darkly colored surfaces like rocks or old logs (decaying wood retains heat very well). When conditions are suboptimal, individuals can be found hiding beneath cover objects.

Mesaspis monticola is a live-bearing species, an adaptation to life at high elevations. Females bask frequently during their prolonged gestation period (up to five months) before giving birth to 2–10 live young. Groups of recently born young have been seen in close association with their mother, and some sort of parental care is hypothesized.

Mesaspis monticola feeds predominantly on arthropods, and is often seen basking in clumps of low, flowering or fruiting vegetation, possibly because the plants attract insect prey. Less common prey items include juvenile salamanders of the genus *Bolitoglossa,* or even young of its own species.

Description





Similar species

- *Gerrhonotus rhombifer* (p. 79), the only other species with lateral skin folds, has an extremely long prehensile tail and inhabits lowlands.
- *Celestus cyanochloris* (p. 86) and *Celestus orobius* (p. 90) are similar in morphology but lack lateral skin folds.

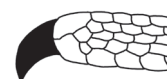
Family Diploglossidae
(Galliwasps)

Members of the family Diploglossidae are distributed throughout Central and South America, and also occur in the West Indies. Currently there are 52 species in three genera: *Celestus*, *Diploglossus*, and *Ophiodes*.

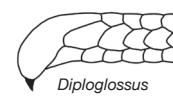
The genus *Ophiodes* contains a handful of South American species that are nearly legless; they typically lack front limbs and have hind limbs that are reduced to small, flaplike structures. Members of the two genera that occur in Costa Rica, *Celestus* and *Diploglossus*, tend to have short but well-developed limbs that show no reduction in the number of digits.

The Costa Rican members of this family are superficially skinklike, with an elongate, cylindrical body, a head that is scarcely wider than the neck, and a long, fragile tail. The head is covered with enlarged plates, while the body and tail scalation consist of relatively uniformly sized cycloid scales that complete encircle the animal; there are no enlarged ventral scales. Typically, the rounded scales in these lizards are reinforced by an underlying bony plate called an osteoderm; these osteoderms are not visible externally, but serve to provide additional protection from predators. The body scales are seemingly smooth and shiny at first glance, but close examination will reveal a striated pattern consisting of several minute parallel ridges on their surface, a diagnostic feature for members of this family.

There are two species of *Diploglossus* and three species of *Celestus* in Costa Rica; all are uncommon to rare. Members of both genera can be told apart based on their claws: in *Celestus* all claws are fully exposed, whereas in *Diploglossus* the claws are covered by a scaly sheath, leaving ony the tip of each claw exposed.



Celestus



Diploglossus

Celestus hylaius

Members of the family Diploglossidae have short but powerful limbs and a proportionally long, slender body and tail. When moving rapidly through dense vegetation, they have a tendency to fold their limbs flat against the body and slither, snake-like, using body undulations to push off against objects and propel themselves without using their limbs.

Celestus cyanochloris

Blue-green Celestus

Least concern

A skinklike lizard with striated, rounded scales of equal size that completely encircle the body; entirely exposed claws on all digits; keeled scales on the upper half of the tail. Coloration relatively uniform; lacks vertical dark stripes on the body and a broad dark band on the flanks. Standard length to 3.9 in (99 mm); total length to at least 9.4 in (238 mm).

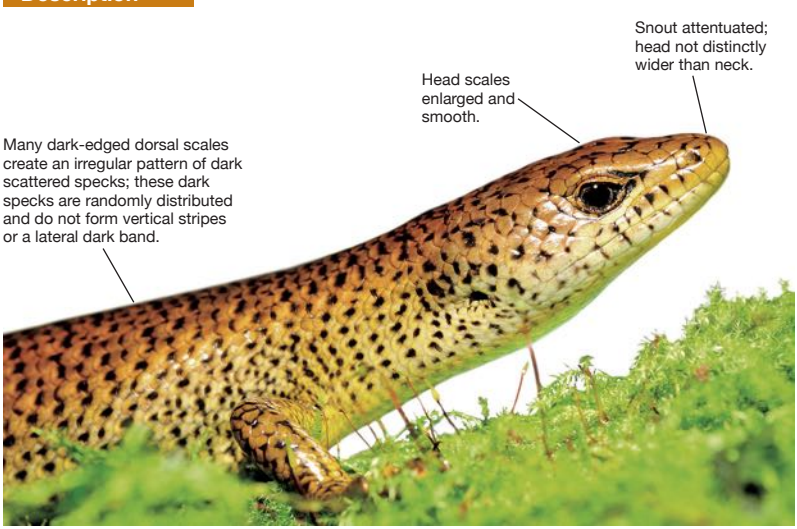
Celestus cyanochloris is a Costa Rican endemic, known from scattered localities in the Tilarán, Central, and northern Talamanca mountain ranges; 3950–5575 ft (1200–1700 m).

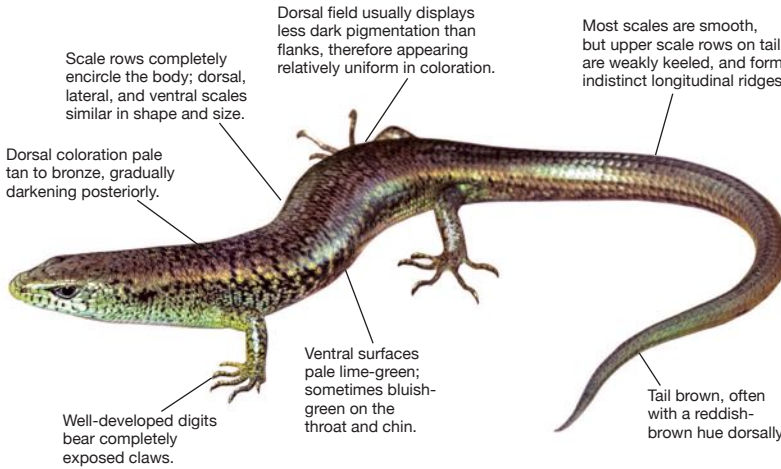
Natural history

Celestus cyanochloris is a very rare lizard. It is known from only a few isolated highland locations, distributed over several of the country's mountain ranges, indicating that this is a widespread but greatly underreported species. Its skinklike appearance likely causes it to be mistaken for more common lizards, and its preference for undisturbed forest habitat, where it can easily dive into leaf litter before being properly observed and identified, exacerbate the difficulty of adequately understanding its distribution and biology.

This species is mostly terrestrial, but reportedly also ascends into low bushes on occasion. Individuals are usually spotted as they actively hunt for insect prey during the day.

Description





Body scales rounded and overlapping; each scale smooth but with striations formed by a series of minute parallel grooves.

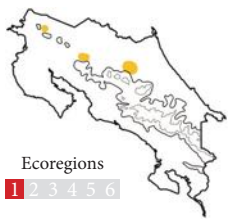
Similar species

- *Celestus hylaius* (p. 88) has a dark lateral stripe and smooth scales on its tail.
- *Celestus orobius* (p. 90) has a pattern of thin, dark-edged vertical stripes on the flanks.
- *Diploglossus bilobatus* (p. 92) has considerable green on its ventral surfaces; its claws are almost entirely concealed within a scaly sheath (only the tips are visible).
- *Mesaspis monticola* (p. 82) has a lateral skin fold.
- *Marisora* species (pp. 252–257) are brown, with a light lateral stripe.

Celestus hylaius
Rainforest Celestus

Near threatened

A skinklike lizard with striated, rounded scales of equal size that completely encircle the body; claws on all digits completely exposed; smooth scales on the upper half of the tail. Dorsal coloration usually bordered below by an irregular dark lateral band or a series of dark blotches. Standard length to 4.2 in (107 mm), total length to 8.3 in (210 mm).



Celestus hylaius is endemic to Costa Rica. It occurs in the Atlantic lowlands, from near sea level to 2325 ft (710 m).

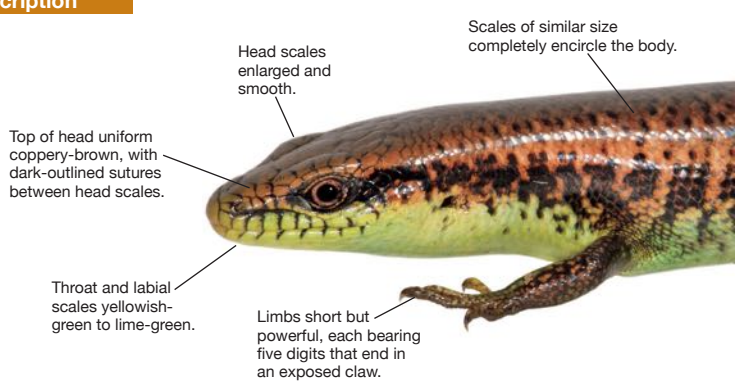
Natural history

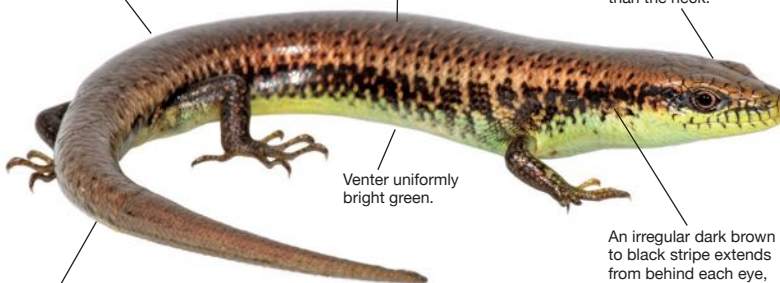
Celestus hylaius is a rare, secretive species that is only known from a handful of individuals. It seems to be most active during the early morning hours, though it has also been seen active at midday and at dusk. It inhabits the leaf litter layer of dense, undisturbed rainforests.

Most individuals have been found on the ground, but one individual was observed climbing to a height of approximately 4 ft (125 cm), and it is possible that these poorly known lizards are at least partly arboreal. *Celestus hylaius* has short but relatively strong, well-developed limbs. When attempting to escape, it moves rapidly by coiling its body in an undulating, snake-like fashion, with the limbs held flat against the body. The habits, diet, and life history of *Celestus hylaius* are largely unknown. It likely eats invertebrate prey, but these lizards have a powerful bite and possibly include hard-bodied prey such as snails in their diet.

Even in areas where these lizards are known to occur, they are still rarely seen. In part, this may be explained by a fossorial lifestyle, spent mostly hidden from view in the dense vegetation and leaf litter of the forest interior. However, occasionally more than one individual may be seen within a short period of time, suggesting that this species experiences periods of increased surface activity. *Celestus hylaius* seems to be most active in March and July, which may coincide with their reproductive period. It is thought to be live-bearing.

Description





Body scales rounded (cycloid) and overlapping; each scale smooth but with striations formed by a series of minute parallel grooves.

Similar species

- *Celestus cyanochloris* (p. 86) lacks lateral dark stripes and has keeled scales on upper tail surface.
- *Celestus orobius* (p. 90) has a pattern of thin, dark-edged vertical stripes on the flanks and has keeled scales on its upper tail surface.
- *Diploglossus bilobatus* (p. 92) has a brown dorsum and green venter; its claws are almost entirely covered in a scaly sheath, leaving only the tips visible.
- *Mesaspis monticola* (p. 82) has a lateral skin fold.
- *Marisora* species (pp. 252–257) are brown with a white lateral stripe.
- *Scincella cherriei* (p. 260) lacks green ventral surfaces.

Celestus orobius

Talamanca Celestus

Data deficient

A skinklike lizard with striated, rounded scales of equal size that completely encircle the body; claws on all digits completely exposed; and keeled scales on the upper half of the tail. Coloration relatively uniform, marked with a series of narrow, dark-edged vertical light stripes on the flanks. Standard length to 3.3 in (83 mm), total length to 7.6 in (197 mm).

Celestus orobius is a Costa Rican endemic. It is known only from a small area on the Pacific slope of the northern Talamanca Mountain Range; 4925–6550 ft (1500–2000 m).

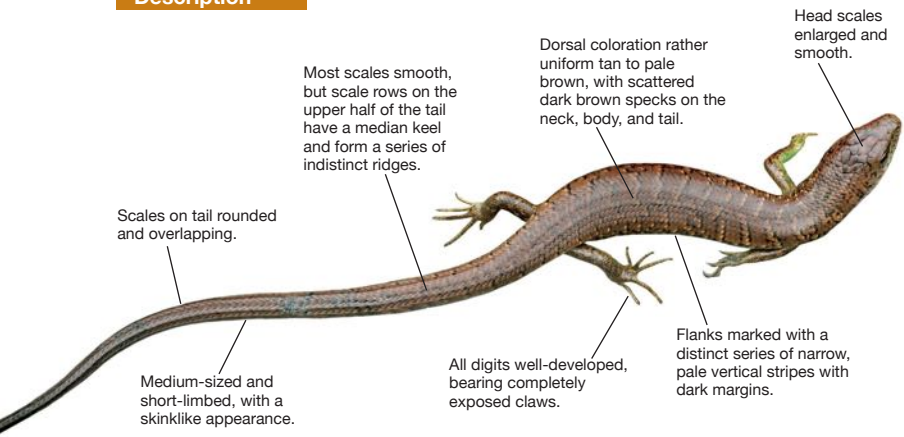
Natural history

This rare species was long known from only a single specimen, but recently other individuals have been reported. Still, hardly anything is known of its biology or the extent of its distribution range, which may be significantly larger than is currently understood. Like other species in its genus, *Celestus orobius* is rarely observed, easily misidentified, and hard to observe because of its secretive habits; it is likely greatly underreported.

Celestus orobius is known from the interior of relatively undisturbed lower montane rainforest or cloud forest. However, recent observations indicate that this species is somewhat tolerant of habitat alteration, and it has also been found near human settlements, in landscaped areas surrounded by forest, or in edge situations within forest (along trails and forest clearings).

It appears to be mostly terrestrial or even fossorial, and has been found under cover objects. Nonetheless, other members of this genus have been observed to climb into low vegetation and *Celestus orobius* may also be somewhat arboreal. This species is thought to be live-bearing, but additional research is needed to confirm this.

Description



All body scales are similar in shape and size; they completely encircle the body. They are rounded and overlapping; each scale is smooth but bears striations formed by a series of minute parallel grooves.

Ventral surfaces uniform white or cream.

Similar species

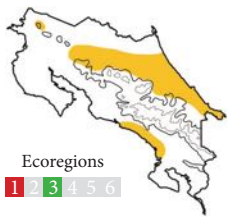
- *Mesaspis monticola* (p. 82) has a lateral skin fold.
- *Celestus cyanochloris* (p. 86) lacks vertical flank stripes.
- *Celestus hylaius* (p. 88) has smooth scales on upper half of the tail.
- *Diploglossus bilobatus* (p. 92) has considerable green on its ventral surfaces, but its claws are almost entirely hidden within a scaly sheath (only the tips are visible).
- *Marisora* species (pp. 252–257) have a pattern of distinct, white longitudinal stripes.

Diplogossus bilobatus

Least concern

O'Shaugnessy's Galliwasp (*Escorpión*)

A medium-sized, skinklike lizard with an elongate, cylindrical body and short limbs. Its claws are mostly covered by a scaly sheath, leaving only the tips exposed. Scales rounded and striated. Usually has a series of light vertical bars on the side of its head and neck, and light-centered black bars on its body. Standard length in males to 3.9 in (99 mm), total length to 9.4 in (240 mm); females generally somewhat smaller.



Diploglossus bilobatus ranges along the Atlantic slope, from northwestern Costa Rica to northwestern Panama. It also occurs on the Pacific slope, in southwestern Costa Rica. From near sea level to 4425 ft (1350 m).

Natural history

Diploglossus bilobatus is a relatively uncommon, secretive species. It is diurnal and both terrestrial and semi-fossorial. Individuals have been found in undisturbed lowland and premontane rainforests; no records exist from disturbed habitats, indicating that this species is not very tolerant of habitat modification. Its skinklike appearance and superficial similarity to other, more common, species is undoubtedly causing *Diploglossus bilobatus* to be misidentified and underreported. Even in well-studied areas, this species escapes detection, which suggests that its habits or microhabitat preferences keep it from being observed easily, in spite of its presence. For example, this species was not recorded for 19 years during herpetological surveys that take place each March in Rara Avis Rainforest Reserve. Then, one March, five individuals were observed in one week, some even occurring inside buildings; none have been documented in subsequent years. Clearly, their activity patterns vary throughout the year, most likely in response to environmental triggers that are still very poorly understood.

Although both males and females were observed during this brief period of surface activity, it is not known whether their increased visibility was due to courtship or breeding activity. No interactions between individuals were noted, but other observers have indicated finding fighting males, which suggests territorial behavior or a battle over a potential mate. Unlike other members of the family Diploglossidae, *Diploglossus bilobatus* is oviparous. It displays some level of parental care, and a female was found under a log, coiled around 6 eggs. Other individuals have been found in association with as many as 15 eggs, but it is not known if these eggs were all from the same female. Females with eggs were found in June, while hatchlings have been reported during the month of August.

Individuals without bold markings on the flanks are easily confused with the skink *Scincella cherriei* (p. 260).

Description

Variable in coloration. Generally has a brown to bronze dorsal field, bordered on both sides by a pair of thin dorsolateral light and dark lines. The dorsal field may be uniform, flecked, or even checkered.

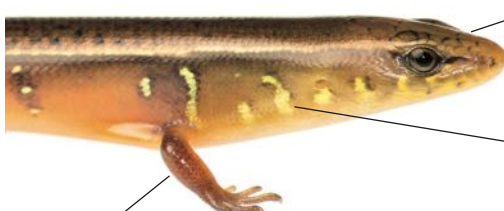
Scales on tail rounded and overlapping; they are smooth and do not form ridges on the upper half of the tail.

adult male

Adults with a greenish venter, gradually changing to pinkish-orange toward the tail; juveniles have cream or pale gray ventral surfaces.

Adult males with black lateral blotches or vertical bars, usually marked with a single, central light spot, or vertical series of spots.

Dorsal, lateral, and ventral scales are all of similar shape and size, and completely encircle the body.

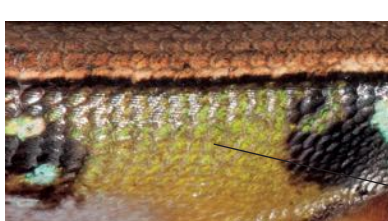


Head scales enlarged and smooth.

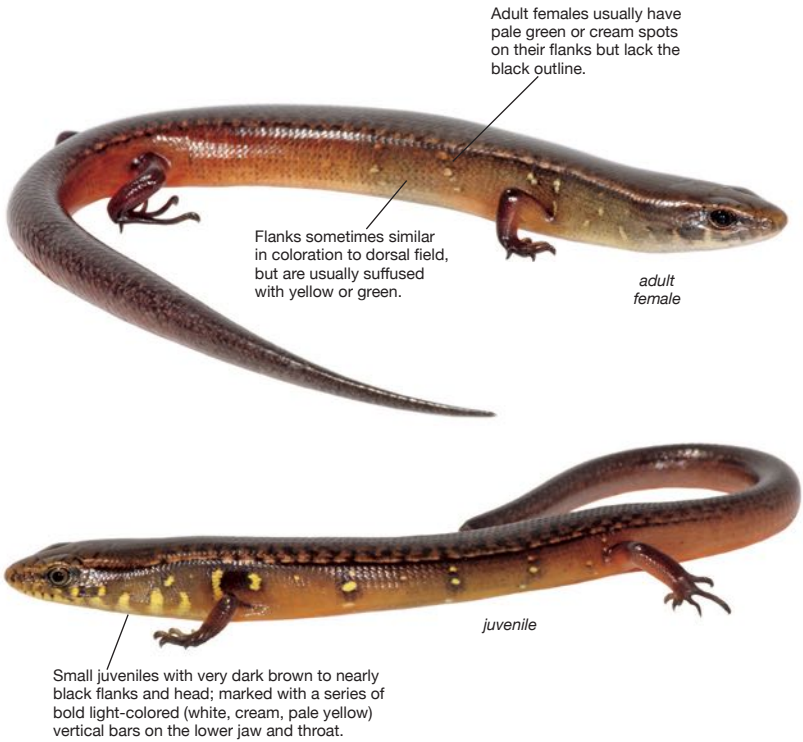
Sides of head and throat marked with a series of short cream or pale yellow vertical bars.

Limbs short and powerful, with long fingers and toes.

Claws almost completely covered by a scaly sheath; only the tips are visible.



Body scales rounded and overlapping; each scale smooth but with striations formed by a series of minute parallel grooves. Adults may have very weakly keeled dorsal scales.



Similar species

- Similar-sized *Celestus* species (pp. 86–91) have fully exposed claws.
- *Scincella cherriei* (p. 260) has exposed claws and never has green ventral coloration.
- *Marisora* species (pp. 252–257) have fully exposed claws and a bold white lateral stripe.

Diploglossus monotropis

Least concern

Orange-bellied Galliwasp
(*Madre de Culebra, Madre Coral, Escorpión Coral*)

A sometimes very large, skinklike lizard. Has a unique color pattern: dorsum dark, top of head tan to yellow, and sides of body and head bright orange to red, marked with a series of black-edged vertical light bars. Standard length to 8.5 in (215 mm), total length to 21.1 in (537 mm); males tend to be larger than females.

Diploglossus monotropis occurs in isolated populations, from southern Nicaragua to western Ecuador; near sea level to at least 3275 ft (1000 m).

Natural history

In spite of its striking appearance and the fact that many people know of *Diploglossus monotropis*, surprisingly little is known about the biology of this lizard. It is an infrequently seen, secretive denizen of undisturbed rainforest that does not appear to tolerate habitat alteration. Individuals are known to persist in relatively small fragments of forest, but this species disappears rapidly when all forest is cleared.

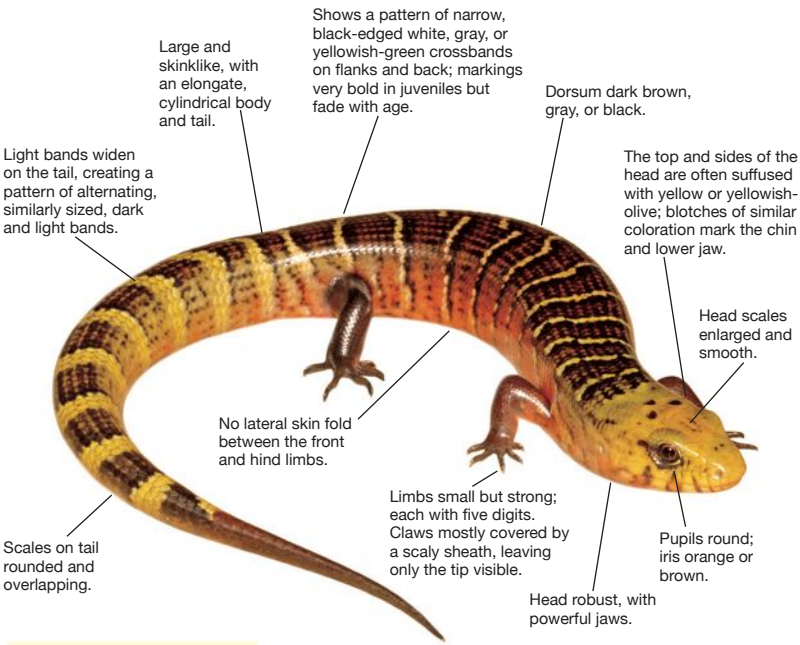
Diploglossus monotropis is diurnal. It is both terrestrial and fossorial, and may spend significant time in underground burrows. It is generally observed moving about in leaf litter; when approached, it flees with surprising agility and speed. Presumably, surface activity is associated with foraging behavior. This species takes a variety of invertebrate prey and is known to include snails and land crabs in its diet. Limited data suggests that egg deposition may be synchronized with annual migration of land crabs in Costa Rica; this specialized food source possibly provides adult females with the extra calcium that is much needed during egg development. Increased road mortality of crabs due to coastal development may have an impact on the populations of this lizard (Quetzal Dwyer, pers. comm.).

An adult *Diploglossus monotropis* was reportedly predated by a sunbittern (*Eurypyga helias*), but it is unclear whether this wading bird captured and killed the lizard, or scavenged the remains of an already dead individual. Other raptors, snakes, and mammals are likely predators of this powerful lizard.

In many parts of Latin America, practically any elongate animal with a considerable amount of red in its coloration is associated with the venomous coralsnakes (genus *Micrurus*). Historically, people believed, incorrectly, that *Diploglossus monotropis* was venomous, and this belief is reflected in some of its local names: *madre de culebra* (mother of serpents), *madre coral* (mother of coralsnakes), and *escorpión coral* (coral scorpion).

In captivity, *Diploglossus monotropis* is known to live for at least 12 years.

Description



Rows of scales that are all similarly shaped and sized completely encircle the body. Each scale smooth, but has striations formed by a series of minute parallel grooves.

Similar species

- *Gerrhonotus rhombifer* (p. 79) has a distinct lateral fold and a long prehensile tail. Juveniles have bold white and dark brown bands across their body and tail but lack bright orange-red markings.

Infraorder Gekkota
(Families Eublepharidae, Gekkonidae, Phyllodactylidae, and Sphaerodactylidae)

All gecko families, worldwide, belong to the infraorder Gekkota, as do members of the family Pygopodidae, a strange-looking group of Australian lizards that are snake-like, nearly legless, and sometimes referred to as flap-footed lizards. Costa Rica has four families of geckos, containing 13 species.

These small to medium-sized lizards generally have a somewhat flattened body and a moderately long tail that is about the same length as the head and body together. All species readily drop their tail to escape predation, and many individuals sport a regenerating tail. Most geckos have very delicate skin that ruptures easily when grabbed, another means of avoiding predation.

The thin skin in geckos is typically covered in minute, non-overlapping scales that are called granular scales. This feature uniquely identifies Costa Rican geckos. Generally, the head, body, tail, and limbs are covered throughout with fairly uniformly sized granular scales, but note that the only Costa Rican member of the family Eublepharidae, *Coleonyx mitratus*, has rows of enlarged, circular scales interspersed with its granular scales.

Another typical feature found in geckos is the absence of moveable eyelids; the eyes are covered with a clear, transparent scale. The Costa Rican exception to this rule is *Coleonyx mitratus*, which does have moveable eyelids.

Most geckos are nocturnal, have vertically elliptical pupils, and have enlarged adhesive toe pads to facilitate an arboreal life. These expanded pads underneath the fingers and toes contain lamella-shaped scales that are each covered in microscopic hairlike extensions that hold on to the most minute imperfections in the surface they walk on. In the aggregate, the adhesive power of these millions of structures allows geckos to walk up smooth vertical surfaces such as windows, or even upside-down on a ceiling. Costa Rican members of the families Gekkonidae and Phyllodactylidae display all of these characteristics. But the tiny Costa Rican geckos in the family Sphaerodactylidae are different. They are diurnal and have round pupils, and they lack enlarged adhesive toe pads, an adaptation to a predominantly terrestrial life.

Infraorder Gekkota at a Glance

Geckos lack enlarged plates on the head; instead, the head, body, limbs, and tail are covered with essentially uniformly sized, non-overlapping, granular scales.

- **Family Eublepharidae (p. 99)**. Medium-sized, with long gangly limbs; eyes with vertically elliptical pupils and moveable eyelids; granular scales interspersed with a series of enlarged circular scales on body and tail.

- **Families Gekkonidae (p. 102)** and **Phyllodactylidae (p. 113)**. Small to medium-sized; eyes with vertically elliptical pupils; digits each bear an expanded adhesive toe pad. Note that these two gecko families differ only in minor molecular characteristics, not in easily visible morphological features. Members of the family Gekkonidae are Old World species that have been introduced to Costa Rica; members of the family Phyllodactylidae are native to the region.

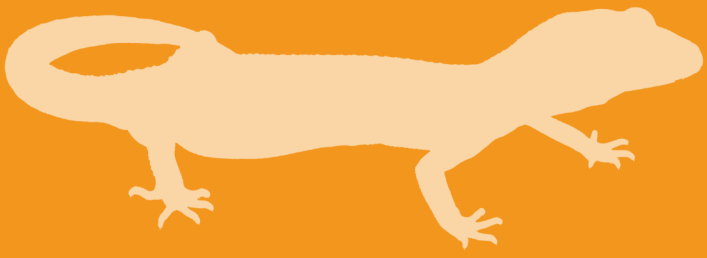
- **Family Sphaerodactylidae (p. 119)**. Small, sometimes tiny; eyes with round pupils; digits lack expanded adhesive pads.

Gecko toes: (a) *Gonatodes albogularis*; (b) *Lepidoblepharis xanthostigma*; (c) *Sphaerodactylus* spp.; (d) *Hemidactylus frenatus*; (e) *Hemidactylus garnotii*; (f) *Hemidactylus mabouia*; (g) *Lepidodactylus lugubris*; (h) *Thecadactylus rapicauda*; (i) *Phyllodactylus tuberculosus*.

Family Eublepharidae
(Eyelid Geckos)

Members of the family Eublepharidae have a combination of features that is unique among the New World geckos: they have moveable eyelids but lack expanded lamellae under the fingers and toes. Only a single genus (*Coleonyx*), containing eight species, occurs in North and Central America, but an additional 30 members of the family Eublepharidae are found in the Old World.

Members of the genus *Coleonyx* range from the southwestern United States to northwestern Costa Rica. These small to medium-sized lizards have minute granular scales covering the head, body, and tail; on the body and tail, these scales are interspersed with enlarged tubercles. Their strikingly large eyes have vertically elliptical pupils. Fingers and toes are slender, lack expanded lamellae or pads, and each bear an exposed claw. One species, *Coleonyx mitratus*, reaches northwestern Costa Rica.

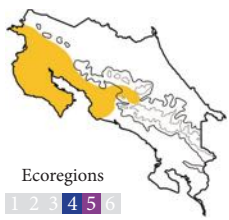


Coleonyx mitratus

Least concern

Central American Banded Gecko (*Geco Escorpión Terrestre*)

A unique, large-headed, big-eyed lizard with moveable eyelids and vertical pupils. Tiny granular scales on its upper surfaces give it a velvety appearance; body, limbs, and tail are marked with irregular rows of enlarged, rounded tubercles. Standard length to 3.6 in (91 mm) in males, 3.8 in (97 mm) in females); total length to 7.5 in (190 mm).



Coleonyx mitratus occurs on the Atlantic slope from eastern Guatemala to Honduras; on the Pacific slope, it is found from western Guatemala to northwestern Costa Rica. From near sea level to 4700 ft (1435 m).

Natural history

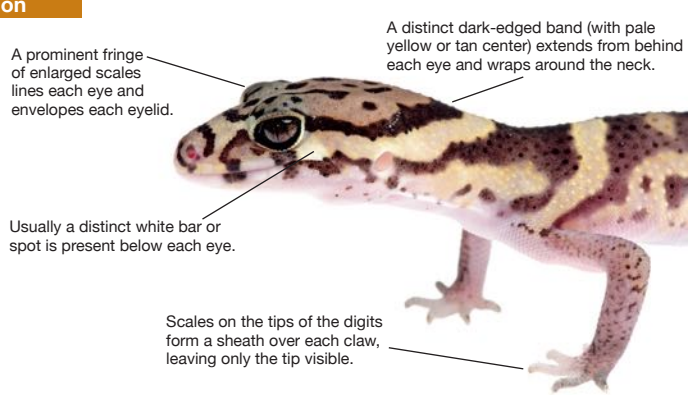
Coleonyx mitratus is a secretive and shy nocturnal species found predominantly in dry lowland forest; it is occasionally found in more humid foothills. This lizard remains hidden in leaf litter on the forest floor or under cover objects during the day and forages actively on the surface at night. It is regularly seen crossing roads at night, or basking on still-warm blacktop after the sun sets. Individuals have also been found inside termite nests and ant hills. *Coleonyx mitratus* feeds on insects and other small invertebrates, and typically moves its tail in an undulating, catlike manner when stalking its prey.

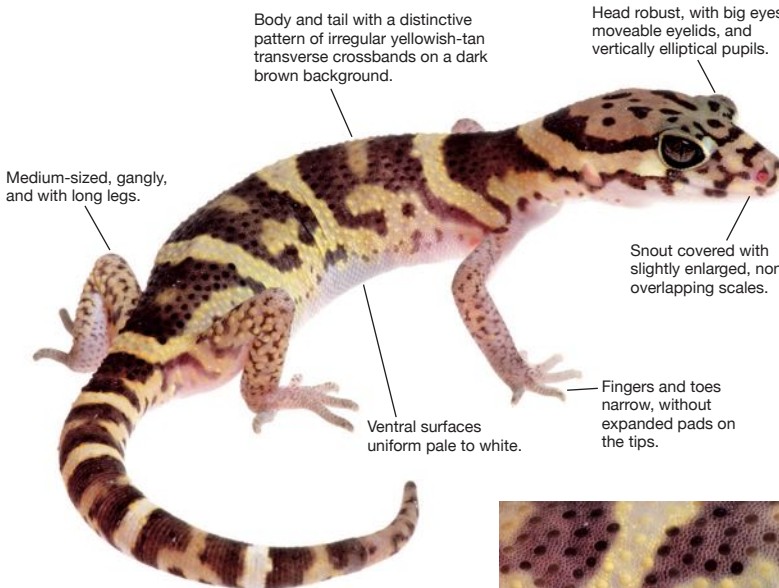
Female *Coleonyx mitratus* produce clutches of two leathery-shelled eggs at a time. The eggs are usually deposited beneath surface objects or in rock crevices. This species' main period of reproductive activity is in the wetter months of the year, and multiple clutches are produced each year.

When alarmed, it raises its body off the ground and assumes a stiff-legged defensive posture, sometimes also inflating the throat. Several species of the genus *Coleonyx* are capable of emitting a high-pitched squeak when grabbed or otherwise provoked. Whether *Coleonyx mitratus* produces such calls is not yet known.

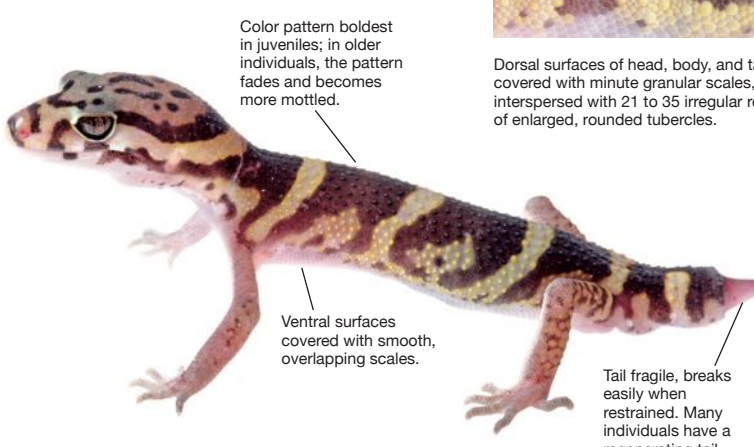
In many parts of Latin America, *Coleonyx mitratus* (and several other gecko species) are erroneously thought to be dangerously venomous.

Description





Dorsal surfaces of head, body, and tail covered with minute granular scales, interspersed with 21 to 35 irregular rows of enlarged, rounded tubercles.



Similar species

- *Phyllodactylus tuberculosus* (p. 115) lacks moveable eyelids and has expanded pads under the tips of its digits.

Family Gekkonidae
(Typical Geckos)

This large family contains 1156 species. The vast majority are found in the Old World, but some have spread into the New World tropics and subtropics in recent history. Four species in two genera are currently found in Costa Rica. One of them, *Hemidactylus frenatus*, has spread into virtually all lowland and middle elevation areas where people have built infrastructure, and it is now quite possibly the most common lizard in the country.

The four species introduced to Costa Rica all commonly occur in close vicinity to humans. Most have traveled out of their native range as stowaways on cargo ships, and their distribution patterns generally radiate out from major port cities or other cargo distribution hubs. At least two species, *Hemidactylus garnotii* and *Lepidodactylus lugubris*, are able to reproduce parthenogenetically, meaning that females can lay unfertilized eggs that result in all-female offspring. This reproductive advantage allows them to colonize new areas quickly, as only a single individual is needed to establish a new population.

Genus *Lepidodactylus*. A genus of 33 small to medium-sized gecko species, primarily found in the Indo-Australian region. One species, *Lepidodactylus lugubris*, has been introduced inadvertently in many tropical regions of the world, including in Central America. *Lepidodactylus lugubris* differs from all other geckos in the region in having expanded subdigital lamellae, of which only the distal ones are divided; it also has basal webs between its digits and lacks a claw on its inner fingers and toes.

Genus *Hemidactylus*. A large group of 149 species. These moderate-sized nocturnal geckos originate in the Old World. The three species that are known to occur in Costa Rica were introduced from Asia (*Hemidactylus garnotii* and *Hemidactylus frenatus*) and West Africa (*Hemidactylus mabouia*).

Species of *Hemidactylus* can be distinguished from other geckos in the region by: vertical pupils and immoveable eyelids; a dorsum covered in heterogeneous scales, with scattered enlarged tubercles mixed in; claws on all fingers and toes; the absence of basal webbing on the hands and feet; and by having divided enlarged subdigital lamellae. Although an individual gecko in the field is readily recognized as a species of *Hemidactylus*, distinguishing between the species is not always easy and may require careful examination of minute characteristics.

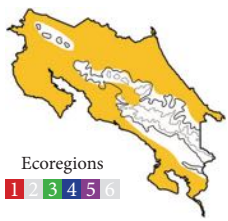
Most geckos, like this *Thecadactylus rapicaudus*, lack moveable eyelids and regularly lick their eyes clean.

Hemidactylus frenatus

Introduced

Common House Gecko (*Geco Casero Común*)

A medium-sized nocturnal gecko that has vertically elliptical pupils but lacks moveable eyelids. Head, body, and limbs covered with small granular scales. Digits bear distinctly expanded lamellae and end in an exposed claw. Tail rounded in cross-section and marked with evenly spaced whorls of enlarged, pointed tubercles (not visible on regenerated tails). Standard length to 2.6 in (65 mm); total length to 5.3 in (135 mm).



Hemidactylus frenatus is an introduced species; it was first reported in Costa Rica in the early 1990s. Now widespread and abundant in homes and other buildings throughout Costa Rica, including metropolitan areas; from near sea level to at least 4850 ft (1475 m). Originally from southeast Asia, but now established in many tropical and subtropical regions.

Natural history

This is a very common to abundant species throughout much of Costa Rica; it is most frequently found in and around human settlements. It is often seen at night on the walls and ceilings of buildings, where it hunts for insects that are attracted by electric lights, but individuals are sometimes active during the day. These lizards are highly territorial and very vocal. Their call, a distinctive series of rapid *chack* sounds, is frequently heard both in the daytime and at night emanating from homes and other man-made structures. Although both males and females call, it is mostly the larger males that produce these sounds, usually as a territorial marker and just before attacking an intruding male.

Hemidactylus frenatus is prolific and produces clutches of two hard-shelled eggs at a time. The eggs are deposited in thatched roofs, in crevices in walls or wood, behind paintings, mirrors, and other wall-hangings, and in piles of debris. Communal nesting is common, and multiple eggs and empty shells can be found clustered together in one location.

Unlike other *Hemidactylus*, which are sometimes all-female species, *Hemidactylus frenatus* populations contain both males and females. One reason why *Hemidactylus frenatus* is so successful at colonizing new areas is that the females can retain viable sperm for up to 8 months. A single female is capable of producing at least 10 clutches of fertilized eggs while isolated from males.

Breeding females can be recognized by the presence of expanded sacs in the neck area. These store calcium carbonate needed for the development of the egg shells; they are visible through the thin skin and look pale when filled.

These common geckos are prey to a wide variety of animals, including snakes and larger lizards such as *Thecadactylus rapicauda*. Other predators that have been reported to feed on *Hemidactylus frenatus* include white-faced capuchin monkeys (*Cebus capucinus*), which have been observed extracting these geckos from people's homes, as well as great-tailed grackles (*Quiscalus mexicanus*).

Hemidactylus frenatus is commonly seen inside buildings after dark. It hunts on walls and ceilings for insects that are attracted to lights.

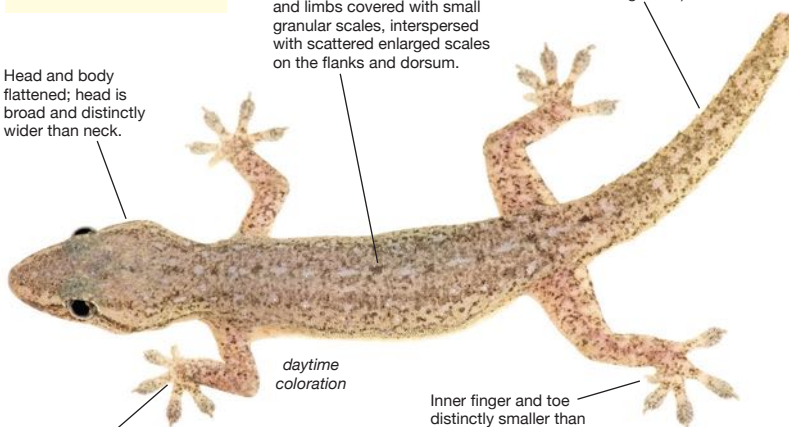
Description

Ashy-gray, grayish-brown to reddish-brown dorsal coloration during the day; either uniformly colored, mottled, or with a pattern of darker blotches.

Tail bears several evenly spaced whorls of enlarged, pointed tubercles; most notable along the edge of the tail (absent from regenerated tail segments).

Upper surfaces of head, body, and limbs covered with small granular scales, interspersed with scattered enlarged scales on the flanks and dorsum.

Head and body flattened; head is broad and distinctly wider than neck.



daytime coloration

Inner finger and toe distinctly smaller than other digits.

All digits bear expanded lamellae and end in an exposed claw.

Males generally larger than females.

Enlarged dorsal scales often paler than the rest of the body, and fairly obvious.

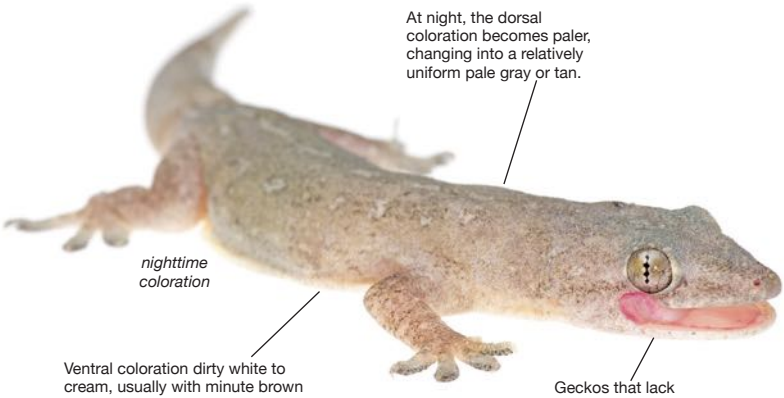
Lacks moveable eyelids; upper eyelid without enlarged tubercles.

Pupil vertically elliptical, with scalloped edges; in bright light, pupil is sometimes reduced to a series of pinprick openings.

An indistinct dark eye stripe starts at the tip of the snout and extends backward to the shoulder. Usually a light colored area is present above this dark stripe.

Limbs short and fairly robust; hands and feet without webbing.

All fingers and toes bear enlarged subdigital lamellae; each digit ends in an exposed claw. Lamellae are split to form two parallel rows; rows are extensive, reaching base of all toes and extending onto soles of feet.



Similar species

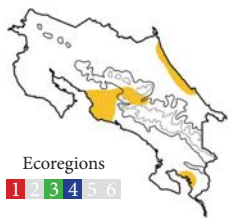
- *Hemidactylus garnotti* has a flattened tail with a serrated edge and scattered white blotches on the body and tail.
- *Hemidactylus mabouia* (p. 109) has many enlarged, pointed tubercles on the head, body, and limbs; it is more boldy patterned than other *Hemidactylus*, and has a banded tail.
- *Phyllodactylus tuberculosus* (p. 115) has only the terminal lamellae under each digit expanded into a leaflike shape.
- *Lepidodactylus lugubris* (p. 111) has no claw on its inner digits, and usually has a series of paired dark spots on the back and (non-regenerated) tail.
- *Thecadactylus rapicauda* (p. 117) has extensively webbed feet and is a much larger species.

Hemidactylus garnotii

Introduced

Indo-Pacific House Gecko (*Geco Casero Indo-Pacífico*)

A medium-sized nocturnal gecko. Has vertically elliptical pupils but lacks moveable eyelids. Head, body, and limbs covered with small granular scales. Digits bear distinctly expanded lamellae and end in an exposed claw. Tail flattened, with a fringe of long pointed tubercles. Head, body, and tail marked with scattered white blotches. Standard length to 2.6 in (65 mm); total length to at least 5.3 in (135 mm)



Hemidactylus garnotii is an introduced species, first observed in the Central Valley of Costa Rica in 1992. It is now locally common, from near sea level to 3775 ft (1150 m). Originally from southeast Asia, but now established in many subtropical and tropical regions.

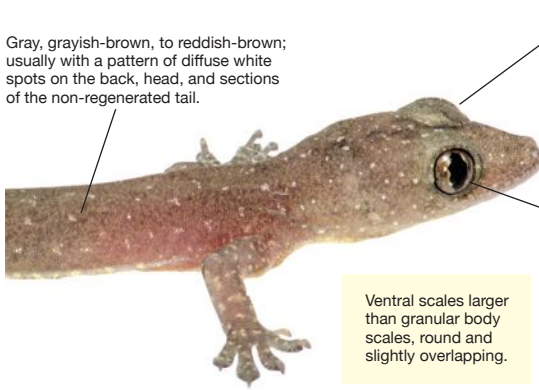
Natural history

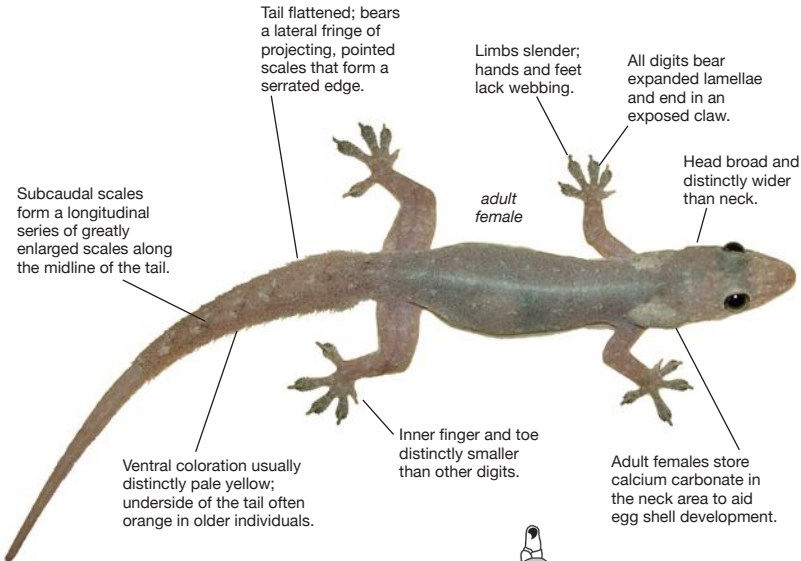
Although not as common and widespread as *Hemidactylus frenatus*, this species can be quite numerous locally. *Hemidactylus garnotii* is mostly found on and in buildings, as well as on trees near buildings. It is a nocturnal species that preys on small insects and other small invertebrates.

This species is known to vocalize when agitated and emits a loud squeak if grabbed. Other defensive strategies include the ready detachment of its tail and the sloughing of skin on the head and body when restrained. Tail and skin will regenerate over time, but their loss does take an energetically significant toll on these animals; the energy needed to regrow these body parts could have otherwise been applied to reproduction or growth.

Hemidactylus garnotii is an all-female parthenogenetic species that is rapidly expanding its range in Central America. Females lay clutches of eggs several times per year; the eggs are spherical and relatively hard-shelled. Adult females have dorsolateral sacs in the neck area, used for storing calcium carbonate, which aids in development of egg shells; these sacs can be seen through the thin skin. Given that the all-female offspring is genetically identical to the mother, the young are, in essence, clones.

Description





Upper surfaces of head, body, and limbs covered with small granular scales; a few scattered enlarged tubercles are intermixed with the flank scales.

All fingers and toes bear expanded, subdigital lamellae; each digit ends in an exposed claw. Lamellae are extensive, reaching base of all toes but not extending onto soles of the feet; lamellae split to form two parallel rows.

Similar species

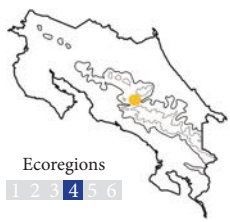
- *Hemidactylus frenatus* (p. 104) is most similar, but has evenly spaced whorls of enlarged, pointed tubercles on its cylindrical tail.
- *Hemidactylus mabouia* (p. 109) has many enlarged, pointed tubercles on the head, body, and limbs; it is more boldy patterned than other *Hemidactylus* and has a banded tail.
- *Phyllodactylus tuberculosus* (p. 115) has only the terminal lamellae under each digit expanded into a leaflike shape.
- *Lepidodactylus lugubris* (p. 111) has no claw on its inner digits, and usually has a series of paired dark spots on the back and (non-regenerated) tail.
- *Thecadactylus rapicauda* (p. 117) has extensively webbed feet and is a much larger species.

Hemidactylus mabouia

Introduced

African House Gecko (*Geco Casero Africano*)

A medium-sized nocturnal gecko. Has vertically elliptical pupils but lacks moveable eyelids. Head, body, and limbs covered with small granular scales interspersed with noticeably enlarged, pointed tubercles. Tail cylindrical, with a longitudinal series of enlarged, pointed tubercles. Digits bear distinctly expanded lamellae and end in an exposed claw. Dorsal markings bold, with alternating dark and light chevrons on body, and bands on tail. Standard length to 2.6 in (65 mm); total length to at least 5.5 in (140 mm)



Originally from tropical Africa, *Hemidactylus mabouia* has been introduced to several Central American countries and is now well-established in Florida (US). It was reported from the Central Valley in Costa Rica in the early 2000s, but its current population status is uncertain.

Natural history

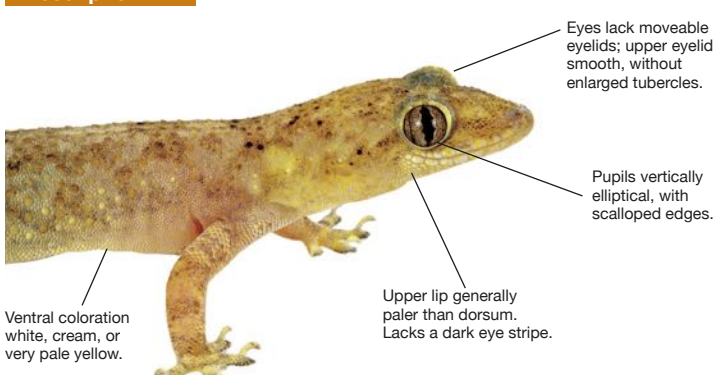
This introduced species is a recent arrival to Costa Rica. It tends to travel as a stowaway in shipments of agricultural products or ornamental plants, and appears first in new countries near ports of entry. The current population status of this species is not clear; the other two species of introduced *Hemidactylus* are far more common in the Central Valley. In areas outside Costa Rica, *Hemidactylus mabouia* is known to occasionally eat small geckos and anoles and perhaps outcompetes other lizards in its range. However, there is no sign of this happening in Costa Rica yet.

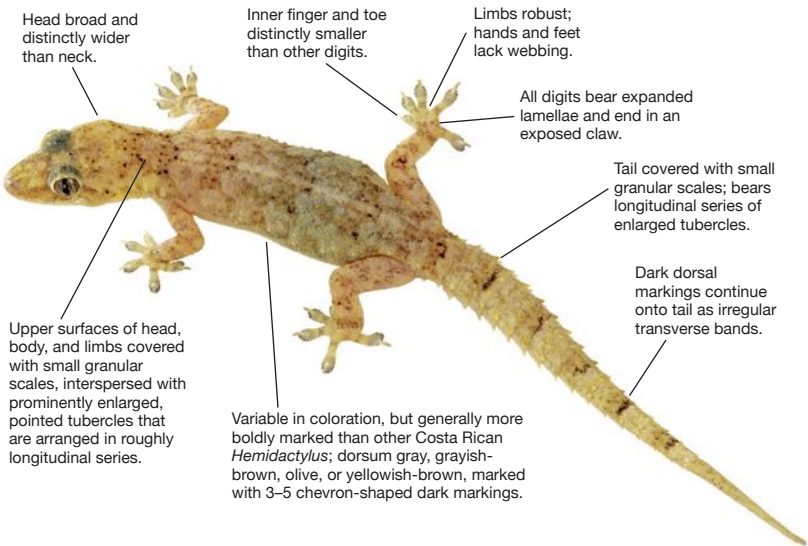
Like other *Hemidactylus*, this species is nocturnal and usually found in or around human settlements. It predominantly feeds on small insects and is often seen hunting for them near electric lights.

Unlike *Hemidactylus garnotii*, in which all individuals are females, this species has males and females. Females lay clutches of two hard-shelled, spherical eggs several times per year. In areas where *Hemidactylus mabouia* is common, multiple females are known to deposit their eggs in communal nests, often located in tree hollows or under loose bark.

Individuals sometimes emit a loud squeak when captured.

Description





Ventral scales larger than granular body scales; rounded with slightly overlapping edges.

A distinctly enlarged series of wide subcaudal scales marks the midline of the underside of the tail.

All fingers and toes bear enlarged subdigital lamellae; each digit ends in an exposed claw. Subdigital lamellae split to form two parallel rows; these do not reach the base of all toes (most noticeable on 4th toe).

Similar species

- *Hemidactylus frenatus* (p. 104) lacks a warty appearance and the banded tail. It has more extensive subdigital lamellae and a more uniformly colored body.
- *Hemidactylus garnotti* (p. 107) has a flattened tail with a serrated edge; it has scattered white blotches on the body and tail.
- *Phyllodactylus tuberculosus* (p. 115) has only the terminal lamellae under each digits expanded into a leaflike shape.
- *Lepidodactylus lugubris* (p. 111) lacks the claw on its inner digits, and usually has a series of paired dark spots on the back and (non-regenerated) tail.
- *Thecadactylus rapicauda* (p. 117) has extensively webbed feet and is a much larger species.

Lepidodactylus lugubris

Mourning Gecko (*Geco Enlutado*)

Introduced

A small nocturnal gecko. Has vertically elliptical pupils but lacks moveable eyelids. Dorsal surfaces covered entirely in uniformly small granular scales; note absence of enlarged scales or pointed tubercles on the body and tail. Distinctly expanded lamellae present underneath each digit; digits tipped with a claw, except the inner finger and inner toe. Standard length to 1.8 in (45 mm), total length to 4.1 in (105 mm).

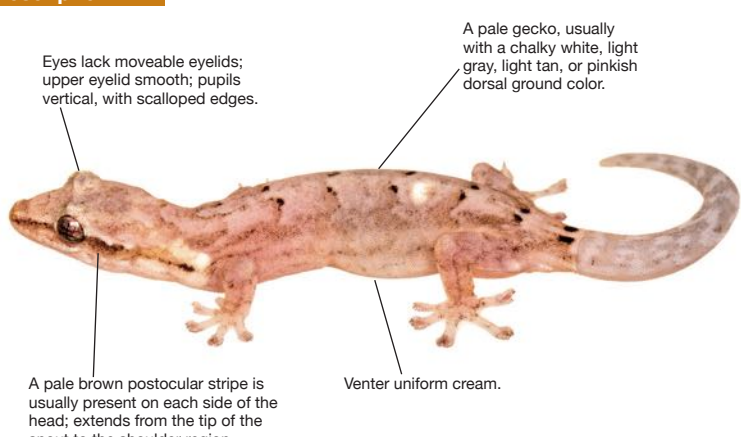
Originally from Southeast Asia, *Lepidodactylus lugubris* has been introduced and occurs throughout the tropics. In Costa Rica, it continues to expand its range and is now commonly found in the lowlands of the south Pacific and southern Atlantic regions, from near sea level to 2300 ft (700 m).

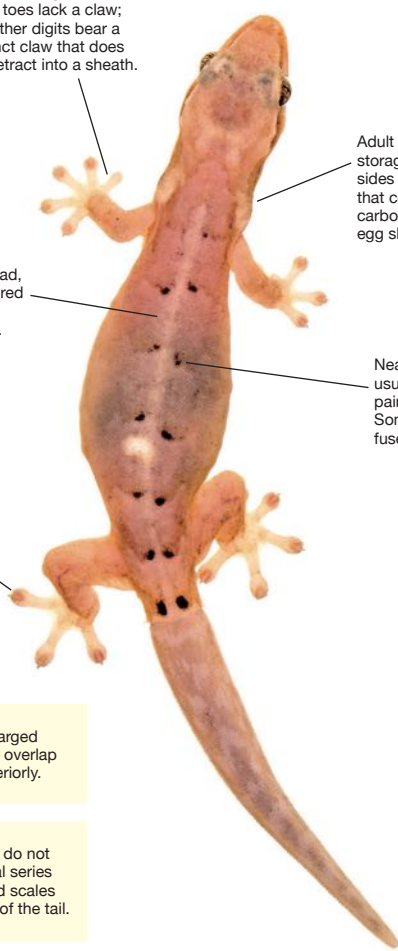
Natural history

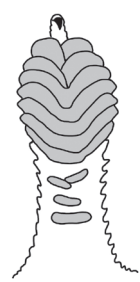
Lepidodactyus lugubris is a common and adaptable nocturnal gecko. It was originally found in several isolated localities throughout Central America, mostly in port cities, but has been expanding its range significantly in the past decade. Many populations of this species are parthenogenetic, consisting only of females who can produce all-female offspring without fertilization; males of this species are rare. This reproductive strategy makes these geckos highly successful at colonizing new areas, since just a single individual hitching a ride in a shipping container can start a new population. Eggs are usually laid in trees, under loose bark, or in leaf axils of palm trees, but are also frequently deposited in the thatched roofs of houses.

Lepidodactyus lugubris is most commonly seen at night, when it hunts for insects around street lights, on the walls of buildings, and on tree trunks.

Description



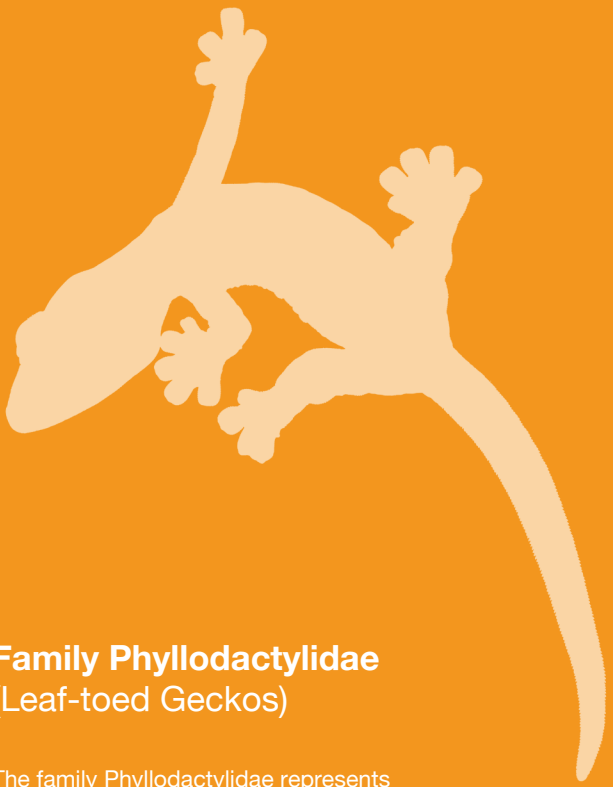




Subdigital lamellae divided near the tip of the digit, but generally not divided at the base.

Similar species

- *Hemidactylus* species (pp. 104–110) are most similar, but have enlarged, pointed scales on the tail and body, and have claws on their inner fingers and toes.
- *Phyllodactylus tuberculosus* (p. 115) has only the terminal lamellae under each digit expanded into a leaflike shape.
- *Thecadactylus rapicauda* (p. 117) has extensively webbed feet and is a much larger species.



Family Phyllodactylidae
(Leaf-toed Geckos)

The family Phyllodactylidae represents a relatively recently described group of geckos, defined mainly on the basis of molecular characteristics. Some 141 species are currently known from the Old World (North Africa, southern Europe, and the Middle East) and the New World tropics and subtropics, including many Caribbean Islands. Two genera, with one species each, occur in Costa Rica.

Genus *Phyllodactylus*. Seventy-five species of small to medium-sized geckos are included in this genus, which was recently restructured to include only species from the Americas and several islands in the Caribbean. One species, *Phyllodactylus tuberculosus*, is widespread throughout the Pacific slope of Central America and reaches northwestern Costa Rica. The geckos in this genus are most easily recognized by having only the terminal lamellae on the tips of the digits expanded to form distinct leaflike pads; the other lamellae below each finger and toe are arranged in a single series. A non-retractable claw sits on top of each digital pad.

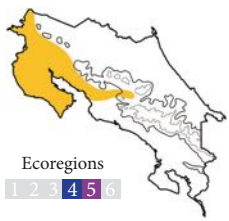
Genus *Thecadactylus*. The genus *Thecadactylus* contains three species of large arboreal, nocturnal geckos; one widespread species, *Thecadactylus rapicauda*, occurs commonly throughout Costa Rica. It is easily distinguished from other local geckos by the greatly enlarged, divided subdigital pads on all digits, and the presence of considerable webbing between the fingers and toes. *Thecadactylus rapicauda* can usually be identified by size alone, as it is far larger than any other gecko in the country.

Phyllodactylus tuberculosus

Leaf-toed Gecko (*Geco Vientre Amarillo*)

Critically endangered

A nocturnal gecko. Small granular scales interspersed with prominent rows of enlarged tubercles cover its body. It has vertically elliptical pupils but lacks moveable eyelids. It is unique in having only a pair of expanded, leaflike lamellae under the tips of each digit. Standard length to 3.9 in (100 mm); total length up to 8.3 in (212 mm)



Phyllodactylus tuberculosus ranges along the Pacific slope, from central Sonora, Mexico, to northwestern Costa Rica; it also occurs locally on the Atlantic slope in Guatemala and Belize. From near sea level to 3800 ft (1160 m).

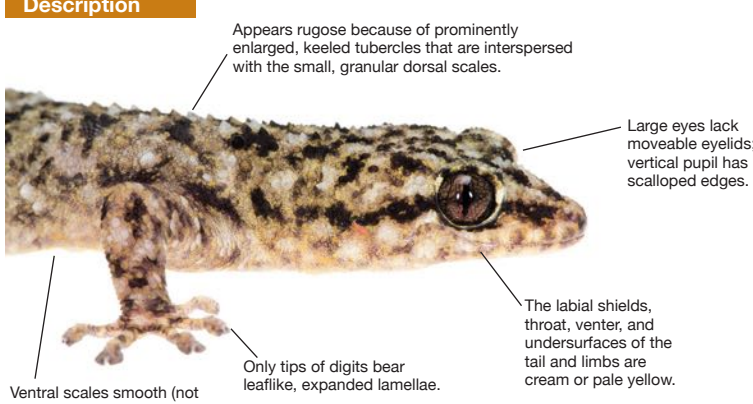
Natural history

This species is fairly common in the dry lowland regions of northwestern Costa Rica. Historical records indicate that *Phyllodactylus tuberculosus* once occurred in the foothills near San José and a few other locations in the Central Valley, but no recent observations exist. Land uses in the urbanized areas of the Central Valley may have rendered the habitat unsuitable for this species, despite the fact that it is quite adaptable. Nevertheless, it is regularly found on walls of houses and on other man-made structures in rural parts of Guanacaste Province. *Phyllodactylus tuberculous* is strictly nocturnal and can be seen hunting for insects around light fixtures after dark.

In more natural settings, this species is generally associated with rocky outcroppings, and can also be found under logs or below loose bark on standing trees. Females produce clutches of two eggs at a time, probably throughout the year. The eggs are relatively hard-shelled and are laid in crevices, under bark, or on the underside of large boulders.

Note that the conservation status of "critically endangered," which was determined during a recent review of all Costa Rican reptile species, is certainly in error.

Description



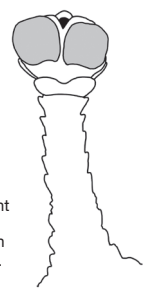
Males usually slightly larger than females.

Dorsal surfaces grayish-brown to pale brown, with a series of irregular, paired dark spots. Spots are often offset in a zig-zag pattern. Additional scattered, small spots mark the head, body, and tail.

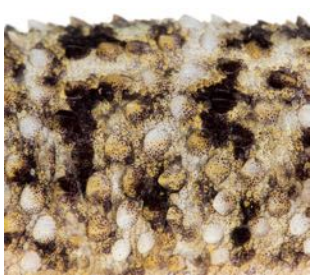
Tail fairly long, roughly equal to the combined length of head and tail.

Many individuals have a regenerated tail. Original tails are marked with alternating light and dark bands; regenerated tails are usually more uniformly patterned.

Capable of considerable color change; usually appears significantly paler at night than during the day.



A pair of expanded, leaflike lamellae present below the tip of each digit; each digit ends in a non-retractable claw.



Enlarged tubercles are loosely arranged in 12–17 longitudinal series that run the length of the body.

Juveniles have a more contrasting color pattern than adults; the tail is vividly colored, likely to draw the attention of predators away from the head.

Similar species

- All other Costa Rican geckos with vertical pupils have more extensively expanded lamellae that are not restricted to the tips of the digits.
- *Coleonyx mitratus* (p. 100) has moveable eyelids, enlarged tubercles interspersed among granular scales that cover its body, and lacks subdigital lamellae.

Thecadactylus rapicauda

Turnip-tail Gecko (*Geco Escorpión*)

Least concern

A large nocturnal gecko. Has vertically elliptical pupils but lacks moveable eyelids. Its very large hands and feet have greatly expanded pads under each digit and extensive weblike skin between the digits. Head, body, and limbs covered with small, uniformly granular scales. Adults usually have a swollen tail base. Standard length to 5.0 in (126 mm); total length to 8.9 in (225 mm).

Thecadactylus rapicauda is an extremely widespread species that occurs in the northern Yucatán Peninsula and southern Chiapas, Mexico, and ranges throughout Central America to northern South America, as far south as central Brazil and northern Bolivia. It also occurs on Trinidad and Tobago, the Lesser Antilles, and several Caribbean islands, including Isla de Maíz Grande, Nicaragua. From near sea level to 3500 ft (1075 m).

Natural history

This is a highly arboreal species that inhabits a wide variety of habitats throughout its extensive range. Although it is commonly found deep within pristine lowland and premontane forests, it also occurs in people's homes. *Thecadactylus rapicauda* is primarily nocturnal, but often starts hunting for large insects at dusk and it is not uncommon to find this species active during daylight hours. Individuals have been found high in the rainforest canopy, at heights greater than 100 ft (30 m). This species is known to "parachute" from tree branches, jumping from great heights and using its extensively webbed extremities to slow down and direct its descent.

Members of this species seem to have fixed territories, as some individuals will inhabit the same retreat for several years in a row. Daytime retreats are generally below loose patches of bark or in tree holes or crevices in tree trunks, but these lizards also inhabit thatched roofs or hide between rafters of buildings. Occasionally, individuals are found in leaf litter accumulations between buttressed roots of large trees. Juveniles sometimes sleep on top of large leaves, in spots where additional leaves provide cover overhead. Small individuals tend to have contrasting dark and light bands on their tail, and sleep with their body and tail curled into a tightly coiled pattern that somewhat resembles a bird dropping.

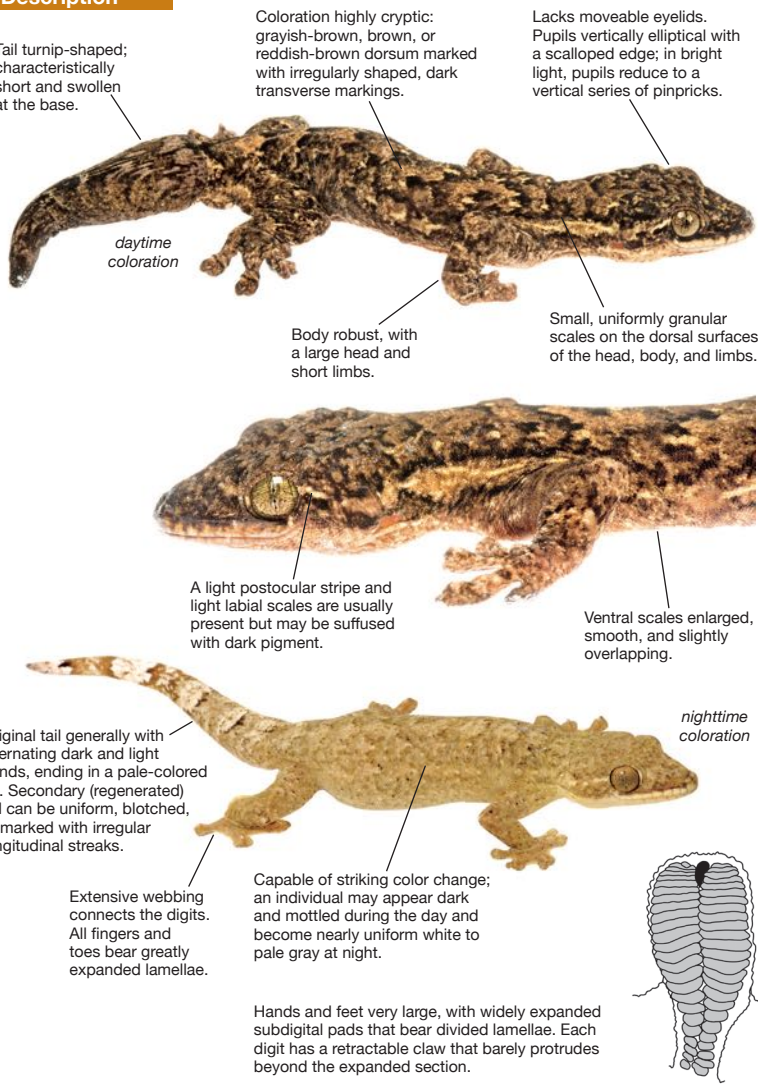
Thecadactylus rapicauda is a very vocal species; it produces a loud series of sharp *chit-chit* calls at night. Calls sometimes elicit a response from another individual and likely serve a social or territorial function.

Female *Thecadactylus rapicauda* typically only produce a single egg at a time, but multiple clutches may be produced in each breeding season.

These powerful geckos primarily feed on invertebrates, and tend to hunt for relatively large prey items such as cockroaches, katydids, crickets, spiders, scorpions, and, occasionally, smaller lizards such as the invasive *Hemidactylus* species, which are encroaching on the natural habitat of *Thecadactylus rapicauda*. When stalking their prey, they sometimes wag their tail in a catlike, side-to-side motion.

Juvenile showing typical sleeping pattern and cryptic coloration.

Description



Similar species

- *Hemidactylus* species (pp. 104–110) have enlarged, pointed scales on the tail and body, and their claws extend well beyond the expanded subdigital lamellae.
- *Phyllodactylus tuberculosus* (p. 115) has only the terminal lamellae under each digit expanded into a leaflike shape.
- *Lepidodactylus lugubris* (p. 111) lacks a claw on its inner digits, and usually has a series of paired dark spots on the back and (non-regenerated) tail.

Family Sphaerodactylidae
(Dwarf Geckos)

The family Sphaerodactylidae consists of some 216 species of small, day-active geckos. They all lack moveable eyelids, have round pupils, and lack expanded subdigital lamellae. Their head, body, and tail are covered in small, granular scales; there are no enlarged tubercles interspersed with the small granular scales. Members of this family contrast sharply in behavior and morphology with the night-active geckos in the families Gekkonidae and Phyllodactylidae, which have greatly enlarged digital lamellae and vertical pupils. Costa Rica is home to 3 genera and 6 species of Sphaerodactylidae.

Genus *Gonatodes*. This genus of small, diurnal lizards is unique among Costa Rican geckos in having undifferentiated fingers and toes that lack expanded terminal scales (the digits bear an unretractable claw); lacking moveable eyelids; having eyes with a round pupil; and lacking a spine-like superciliary scale on the edge of the upper eyelids. The exact composition of this genus is still unclear, but nearly 40 species are currently included, most of them South American forms. Only a single species, *Gonatodes albogularis*, occurs in Costa Rica, where it is commonly seen throughout the lowlands.

Genus *Lepidoblepharis*. This predominantly South American genus contains 21 species of small, diurnal leaf-litter geckos; one species, *Lepidoblepharis xanthostigma*, occurs in Costa Rica. These lizards can be distinguished from other geckos in the region in having narrow digits that are not expanded into subdigital pads, and in having retractable claws that can disappear into a symmetrical, scaly sheath. In addition, *Lepidoblepharis* has round pupils, lacks moveable eyelids, and its upper eyelids do not bear a spine-like superciliary scale, but rather have a flaplike extension.

Genus *Sphaerodactylus*. This is a very large genus, consisting of more than 100 species of tiny geckos, with its main center of diversity in the Caribbean. Many species are restricted to specific islands and relatively few species occur on the mainland of Central America. Three species in this genus are found on mainland Costa Rica, while a fourth species (*Sphaerodactylus pacificus*) is only found on Cocos Island, a Costa Rican territory located some 310 miles (500 km) off the Pacific coast.

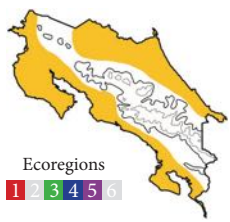
Geckos of this genus are very small, usually less than 1.4 in (35 mm) in standard length. *Sphaerodactylus* species differ from other geckos in Costa Rica by lacking moveable eyelids, having round pupils, and having a distinctly enlarged, spine-like superciliary scale on the edge of its upper eyelids. This spiny scale is usually located anterior to the center of the eye and faces slightly forward. These lizards lack distinctly expanded subdigital lamellae but do have a retractable claw at the tip of each digit, which is slightly offset and retracts into an asymmetrical scaly sheath located below an enlarged terminal pad. The considerable inter- and intraspecific variation in coloration and pattern in these lizards, combined with the fact that certain diagnostic features are barely visible with the naked eye, makes geckos of the genus *Sphaerodactylus* difficult to identify under field conditions.

Gonatodes albogularis

Yellow-headed Gecko (*Geco de Cabeza Amarilla*)

Least concern

A small to medium-sized, diurnal gecko that lacks expanded pads under the fingers and toes, has a round pupil, and lacks moveable eyelids. There is no distinct spine-like scale on the upper eyelids. Yellow head, dark body, and sky-blue markings of males are distinctive; females mottled with light brown, cream, and black. Standard length to 1.9 in (48 mm); total length to 4.4 in (113 mm).



Gonatodes albogularis ranges widely throughout the lowlands of southern Mexico and Central America, from Chiapas, Mexico, on the Pacific slope and eastern Guatemala on the Atlantic slope to northern South America; near sea level to 3275 ft (1000 m). It also occurs on several Caribbean islands and has been introduced to southern Florida.

Natural history

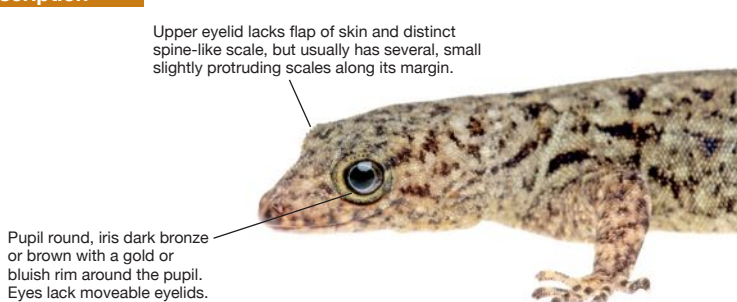
Gonatodes albogularis has a completely diurnal activity pattern. It is often seen basking in the early morning and late afternoon, favoring tree trunks, walls, and fences. It can be quite common on the coconut palms that line most beaches, and it is a frequent visitor in people's homes. Individuals can be seen darting through shaded areas and chasing after crawling insects and spiders near their hiding place, often a crevice in a tree trunk or under cover objects. These geckos tend to live less than 7–10 ft (2–3 m) above the ground

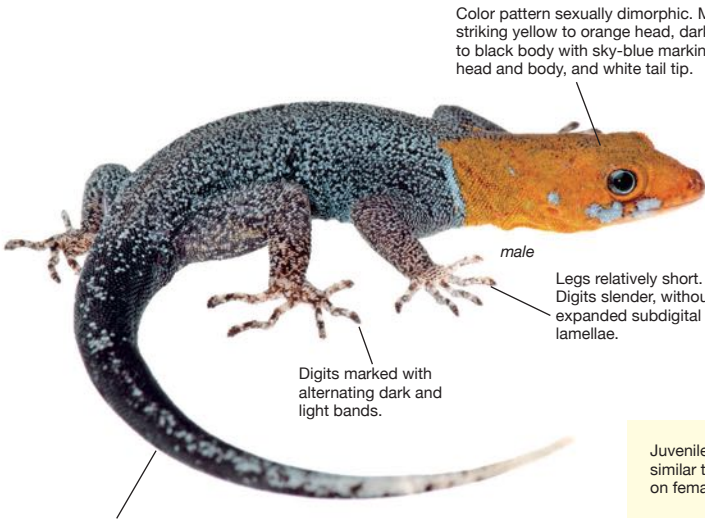
Although *Gonatodes albogularis* reproduces throughout the year, reproductive activity slows down during the dry season and peaks during the rainy season. Females lay a single, spherical, hard-shelled egg at a time. Eggs hatch about 4 months later, and juveniles can reach sexual maturity at the age of 6 months, when they measure 1.6 in (40 mm) in standard length.

Males are very territorial; when two males approach each other too closely they raise their body off the ground on outstretched legs and curl their tail over the back to emphasize the white tail tip (only present in non-regenerated tails). While maintaining this posture, the males continue approaching each other in a jerky motion. When posturing does not resolve the territorial dispute, head shaking may ensue, followed by a rapid chase and occasionally a bite.

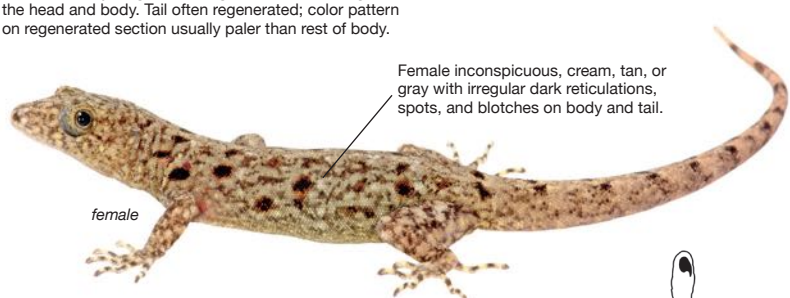
It has been suggested that the introduced anole *Anolis cristatellus* has outcompeted, and locally replaced, *Gonatodes albogularis* along the Atlantic coast of Costa Rica, but both species still seem to occur there in significant numbers.

Description





Juvenile pattern similar to that on female.



Head, body, and tail covered with smooth, uniformly sized granular scales.

Each finger and toe tipped with an exposed claw.

Similar species

- *Lepidoblepharis xanthostigma* can retract its claws into a scaly sheath, has a fleshy flap connected to the upper eyelid, and has a different color pattern than *Gonatodes albogularis*.
- *Sphaerodactylus* species in range (pp. 125-132) all have a spine-like superciliary scale on top of the upper eyelid.
- Male *Sphaerodactylus homolepis* (p. 127) sometimes have a yellow head but never have a black body and tail.

Lepidoblepharis xanthostigma

Leaf Litter Gecko (*Geco de Hojarasca*)

Least concern

A small, diurnal leaf-litter gecko. Has round pupils and lacks moveable eyelids. A small flap of skin protruding from the top of each eyelid is diagnostic. Fingers and toes lack expanded pads, and each digit ends in a claw that can be retracted inside a scaly sheath. Standard length in both males and females to 1.8 in (45 mm); total length to 3.5 in (90 mm).

Lepidoblepharis xanthostigma occurs from southeastern Nicaragua on the Atlantic slope, and northwestern Costa Rica on the Pacific slope, to northern Colombia; from near sea level to 4475 ft (1360 m).

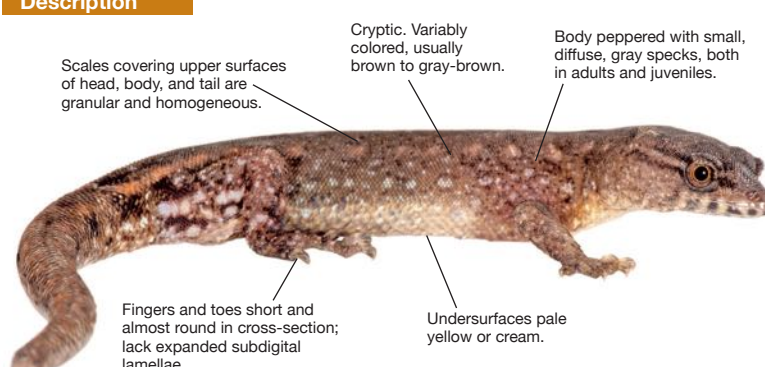
Natural history

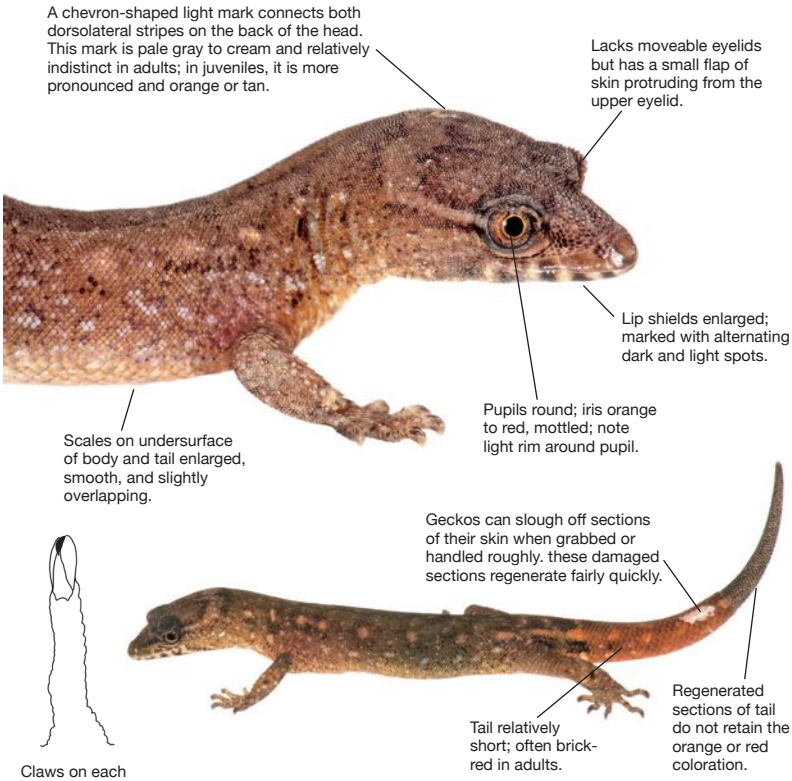
This small diurnal gecko is a common inhabitant of the leaf litter substrate in humid and wet forests. As most of its activities take place within the leaf litter layer, it is more often heard than seen. In areas with less rainfall, *Lepidoblepharis xanthostigma* is generally restricted to gallery forests along streams and rivers, and other riparian settings. Occasionally, it can be found along the banks of streams, hidden in the accumulated debris at the high-water line.

This species feeds primarily on isopods and small arachnids such as spiders and mites. Reproduction takes place year-round in humid forest but may be temporary halted in drier parts of its range, where humidity levels drop seasonally. Females produce only a single egg at a time, and hatchlings are tiny, with a standard length of about 0.6 in (1.5 cm).

The easiest way to find these little day geckos is to shuffle your feet through areas with leaf litter accumulation to try to flush one to the surface. Be mindful when handling these small, delicate geckos, as their skin sloughs off easily and their tail autotomizes with even the lightest touch as an antipredator defense. Skin and tail will eventually regrow, but this process requires considerable energy and will temporarily disadvantage the animal.

Description





Similar species

- *Sphaerodactylus* species (pp. 125–132) have a small spine-like scale on top of the eyelid.
- *Gonatodes albogularis* (p. 121) is larger, has obvious non-retractable claws, and lacks the flap of skin protruding from the upper eyelids.

Sphaerodactylus graptolaemus

Least concern

Pacific Dwarf Gecko (*Geco Enano Pacífico*)

A tiny terrestrial gecko that lacks moveable eyelids but has round pupils and a projecting, spine-like scale on the edge of its upper eyelids. Most easily recognized by the pattern of irregular dark and light longitudinal stripes on the head, neck, and, often, body. Males and females reach a standard length of 1.3 in (32 mm); total length at least 2.6 in (65 mm).

Sphaerodactylus graptolaemus is found in the Pacific lowlands of southwestern Costa Rica and adjacent Panama; from near sea level to 2300 ft (700 m).

Natural history

This diurnal species is fairly common locally. It inhabits moist and wet lowland forests. Individuals occur in the leaf litter and low on tree trunks in undisturbed forest; seemingly adaptable, they also regularly occur in greatly altered habitats in the immediate vicinity of humans. Individuals have also been found within the wrack line of woody debris along the hide tide line of forest streams.

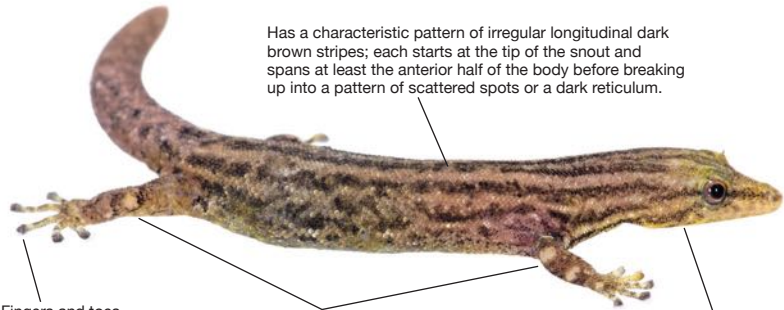
These tiny lizards are quite fragile and their skin sloughs off easily when grabbed. The tail autotomizes quickly; many adult individuals have a regenerated tail. Individuals sometimes present the delicate tail when facing a potential predator, and a few *Sphaerodactylus graptolaemus* have been seen to form the tail into a horizontal curl, thus displaying the salmon-colored underside; this behavior may be intended to direct a possible attack towards the tail instead of a more vital organ. When separated, the autotomized tail continues to move erratically for several minutes, deflecting attention away from the escaping lizard. The high incidence of regenerated tails in many populations indicate that there is significant predation pressure on this species. One individual was found as it was being consumed by a large land crab; given their small size, these lizards likely face a wide range of vertebrate and invertebrate predators.

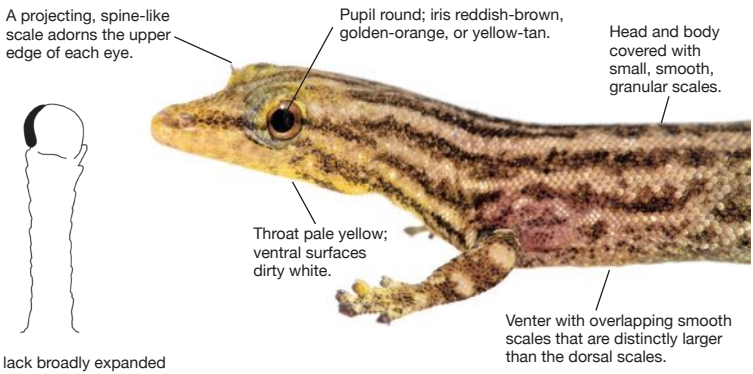
Sphaerodactylus graptolaemus feeds on tiny invertebrates such as small ants, mites, and springtails and other small prey.

Little is known about its reproductive biology, but females likely produce a single hard-shelled egg at a time, and perhaps do so year-round.

When threatened, this gecko curls and raises its tail to expose the orange color on the underside. This behavior likely encourages a predator to attack the detachable tail rather than the lizard's head.

Description





Digits lack broadly expanded lamellae, but end in a slightly expanded and flattened tip; digits bear a small claw that retracts into an asymmetrical scaly sheath.

Tail covered with overlapping, and mostly smooth, enlarged scales; a longitudinal series of greatly enlarged subcaudal scales is present along its ventral midline.

Fairly short tail is roughly the same length as the combined length of the head and body; tail breaks off easily and is often in a state of regeneration.

Similar species

- No other *Sphaerodactylus* species occur in its distribution range.
- *Lepidoblepharis xanthostigma* (p. 123) lacks the spine-like, protruding scale on the upper eyelids and the striped head pattern.
- *Gonatodes albogularis* (p. 121) has a distinct claw on each digit and lacks a protruding spine-like scale on the upper eyelids. Female *Gonatodes albogularis* has a similar color pattern but is never striped.

Sphaerodactylus homolepis

Least concern

Caribbean Dwarf Gecko (*Geco Enano Caribeño*)

A tiny, terrestrial gecko. Lacks movable eyelids and has round pupils and a projecting spine-like scale on the upper eyelids. Adult males are predominantly yellow (especially on head and tail). Females and juveniles variably colored, with beautiful, striped head and several black crossbands or transverse blotches on body and tail. First black band behind the head usually forms a complete collar. Males and females reach 1.4 in (35 mm) in standard length; total length to 2.8 in (72 mm).

Sphaerodactylus homolepis occurs in the Atlantic lowlands, from extreme southeastern Nicaragua to central Panama; near sea level to 2375 ft (725 m).

Natural history

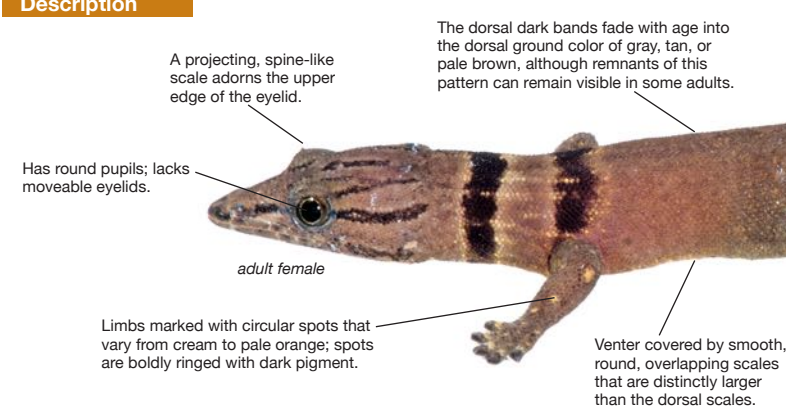
Although *Sphaerodactylus homolepis* is fairly common throughout its range, it is easily overlooked because it is small and secretive. Adding to that, the difficulty in identifying this species (which is similar in appearance to the closely related species *Sphaerodactylus millepunctatus*) has created considerable confusion.

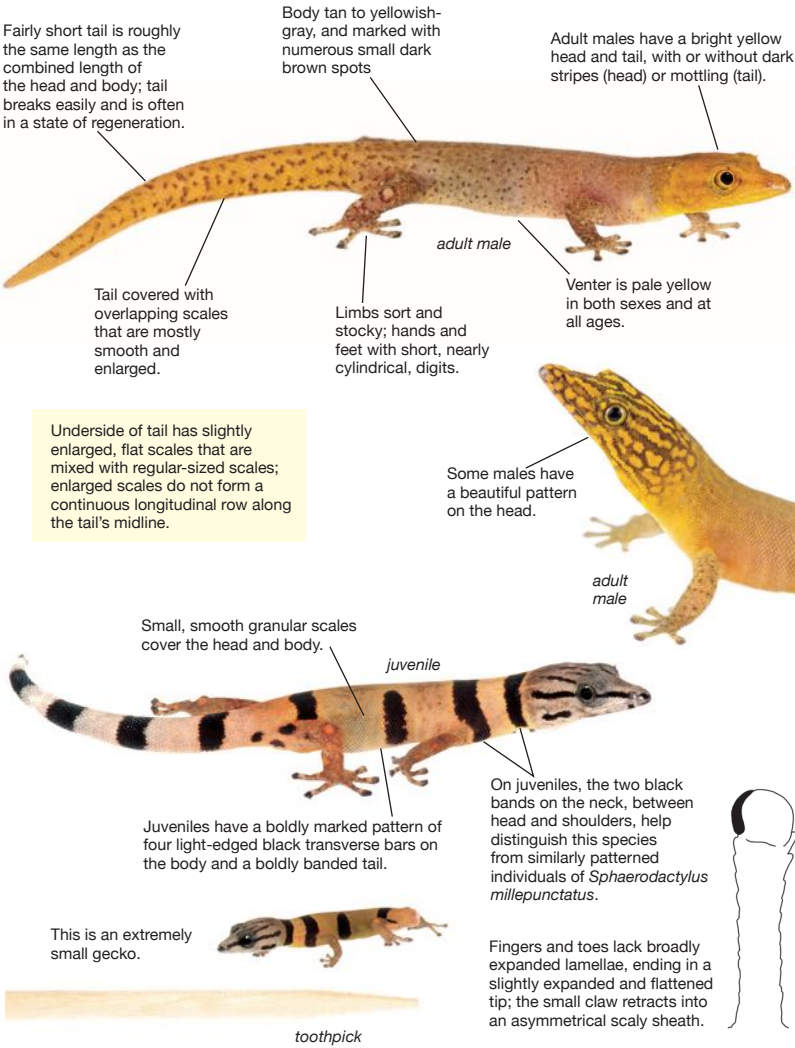
These day-active little geckos mostly inhabit the leaf-litter layer of the forest floor in relatively undisturbed forests; but they do climb well and have been found under loose bark on standing trees, or in the crevices in the trunks of large strangler fig trees. One individual was observed walking up a tree trunk at a height of about 23 ft (7 m) above the ground.

Sphaerodactylus homolepis feeds on tiny invertebrates, and individuals have been observed sitting next to ant trails, feasting on the passing insects. It is not know whether this species specializes in eating ants.

Little is known about its reproductive biology, but female *Sphaerodactylus homolepis* likely produce one hard-shelled egg at a time, perhaps more than once in the course of the year.

Description





Similar species

- *Sphaerodactylus millepunctatus* is very similar in appearance but generally has fewer dark bands on the body, and usually only shows a black mark with a pale outline in the shoulder region and another in the pelvis area. Has a median series of enlarged subcaudal scales under the tail.
- *Lepidoblepharis xanthostigma* (p. 123) lacks the spine-like, protruding scale on the upper eyelids and the striped head pattern.
- *Gonatodes albogularis* (p. 121) has a distinct claw on each digit and lacks a protruding spine-like scale on the upper eyelids. Female color pattern similar but never striped.

Sphaerodactylus millepunctatus

Spotted Dwarf Gecko (*Geco Enano Punteado*)

Least concern

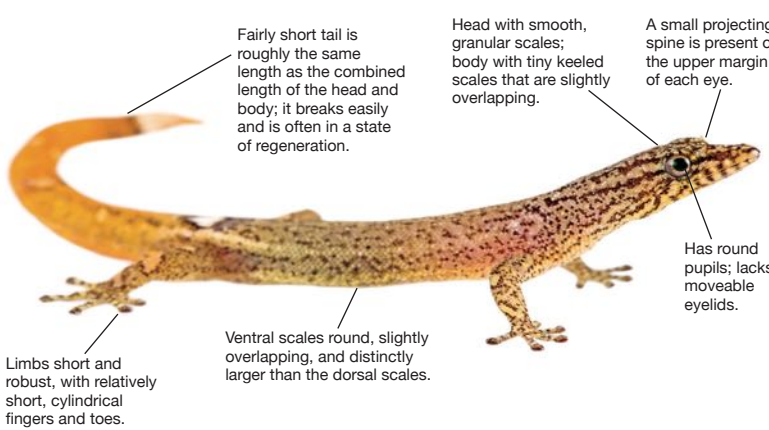
A tiny terrestrial gecko without movable eyelids; it has round pupils and a distinct, projecting spine-like scale on its upper eyelids. Usually variously spotted or mottled, but with a distinct light-bordered black blotch in the pelvic region and (often) another one in the shoulder region. Males and females reach at least 1.2 in (31 mm) in standard length; total length to 2.5 in (63 mm).

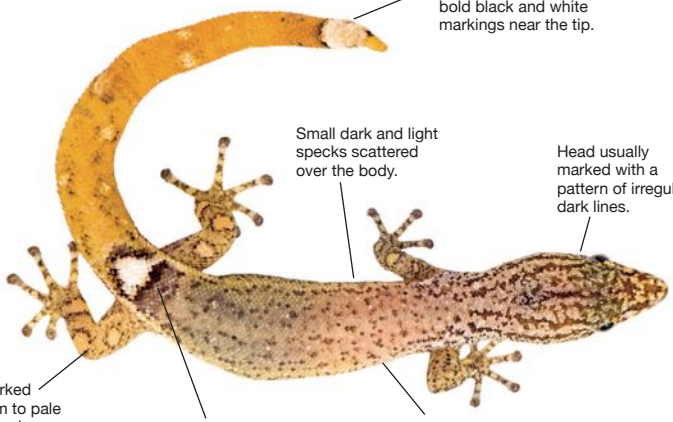
Sphaerodactylus millepunctatus occurs in the Atlantic lowlands, from the Isthmus of Tehuantepec, Mexico, to northeastern Costa Rica; near sea level to 2450 ft (750 m).

Natural history

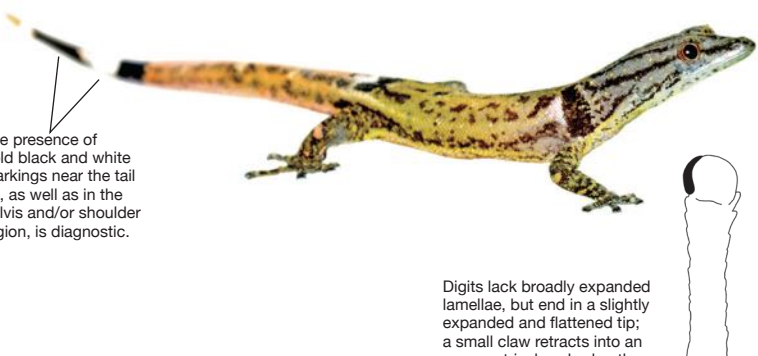
This tiny, diurnal lizard is relatively common, but it is secretive and easily overlooked. It mostly inhabits undisturbed humid lowland forest, but also occurs in or near man-made structures in otherwise forested areas. Its preferred habitat is the thick leaf litter substrate on the floor of humid and wet forests. Individuals are sometimes uncovered when flipping surface debris and other cover objects, but these agile climbers also occur under loose bark on standing trees, in crevices in rock faces, and in trunks of large trees. Strangler figs, with their complexly shaped and convoluted trunk, are a favored retreat and oviposition site for *Sphaerodactylus millepunctatus*. This species is oviparous; it lays its eggs in crevices and under the loose bark of standing trees. Oviposition probably takes place year-round, but in areas with a prolonged dry season there may be a temporary decrease in reproductive activity in the driest months. Clutch consists of a single hard-shelled egg, which is firmly attached to the substrate and cannot be removed without breaking the shell.

Description





Tail covered with enlarged, overlapping, and mostly smooth scales; a longitudinal series of greatly enlarged subcaudal scales is present along the midline of the tail's underside.



Similar species

- *Sphaerodactylus homolepis* (p. 127) is very similar, but usually has more black crossbands on the body and tail; males are mostly yellow; also lacks row of enlarged subcaudal scales.
- *Lepidoblepharis xanthostigma* (p. 123) lacks spine-like projecting scale on upper eyelid (has a flaplike appendage instead).
- *Gonatodes albogularis* (p. 121) lacks spine-like projecting scale on upper eyelid and has exposed claws on all digits.

Sphaerodactylus pacificus

Least concern

Cocos Island Dwarf Gecko (*Geco Enano Isla de Coco*)

A small, nocturnal gecko. It is the sole gecko species on Cocos Island. Lacks moveable eyelids; note small, granular scales covering the head, body, and tail. No expanded lamellae below each digit, but finger and toe tips are slightly expanded. Standard length in males and females to 1.9 in (49 mm); total length to 3.9 in (100 mm).

A Costa Rican endemic, found only on Cocos Island, which is located approximately 340 miles (550 km) off the Pacific coast of mainland Costa Rica.

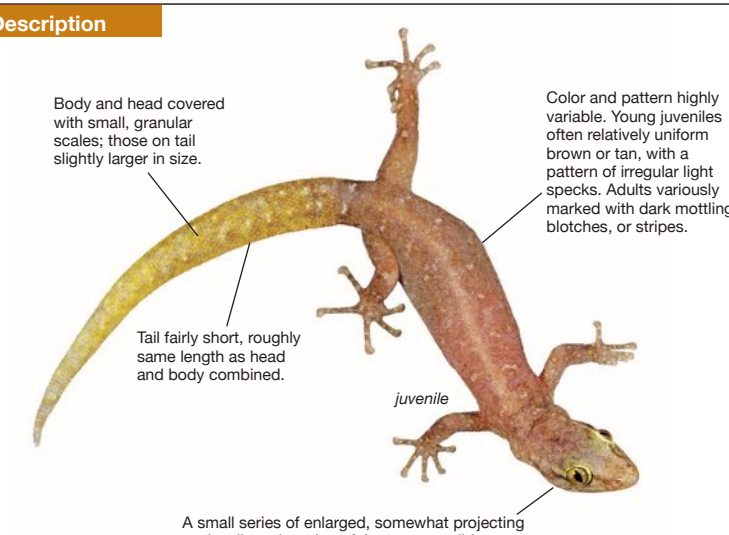
Natural history

Sphaerodactylus pacificus is most commonly found under surface debris such as logs and rocks. It is relatively common in the vegetated areas that line the island's beaches, and likely occurs inland as well.

This is a nocturnal species, unlike the other Costa Rican *Sphaerodactylus* species.

This species is oviparous; it produces one egg at a time. Eggs can be found between the roots of coconut palms, hidden in crevices near the ground, or located below loose bark on standing trees. Generally, eggs are not found singly, indicating that females repeatedly use the same oviposition site or that communal nesting may occur in this species.

Description



Ventral scales much larger than dorsal scales; smooth with rounded, overlapping edges.

Tail breaks easily; it is in a state of regeneration in many individuals.

Most individuals have a narrow, dark postocular stripe that is bordered above and below by a broad light band.

Fingers and toes lack broadly expanded lamellae, ending in a slightly expanded and flattened tip.

adult

Eyes lack moveable eyelids; pupils vertically elliptical.

Each digit bears a small claw that retracts into an asymmetrical scaly sheath.

One of the largest members of the genus, but still small.

Sphaerodactylus pacificus shows tremendous variation in color and pattern.

Similar species

- There are no similar species. The only other lizard that occurs on Cocos Island is *Anolis townsendi* (p. 222), which has moveable eyelids and expanded lamellae under its fingers and toes.

Infraorder Iguania
(Families Corytophanidae, Dactyloidae, Iguanidae, Phrynosomatidae, and Polychrotidae)

This large, diverse infraorder includes a variety of well-known lizards. Among these are the Old World agamas and chamaeleons and a variety of iguana-like lizards that mainly occur in the New World. The interesting exceptions to this rule are four species of spectaculary colored iguanas that inhabit the South Pacific island of Fiji and a few nearby islands, as well as a family of Madagascan lizards (family Opluridae) that are related to New World iguanas but are widely separated geographically. (A similarly intriguing biogeographic pattern is seen in another reptile group, the boas.)

In Costa Rica, this infraorder includes 49 species distributed over 5 families. These are among the most iconic lizards in the country, including green iguanas, basilisks, and the ubiquitous anoles. They vary widely in appearance and biology; many are semi-arboreal or completely arboreal. All have fragmented, small scales on the head (never greatly enlarged, symmetrical plates), moveable eyelids, round pupils, and a distinctly visible external ear opening. The limbs are well-developed and are often long and powerful. All digits are tipped with a strong claw; in some groups, the digits are modified: basilisks have moveable skin fringes on the digits and anoles have expanded lamellae. Typically the scales overlap; they may vary in appearance, size, and location on different parts of the body, and range from smooth to very heavily keeled and spiny.

In addition to these shared characteristics, members of the five Costa Rican families can be identified as follows:

Infraorder Iguania at a Glance

- **Family Corytophanidae (p. 135)**. Medium to large-sized. All have a conspicuous crest on the head; sometimes additional sail-like crests are present on the back and/or tail.

- **Family Dactyloidae (p. 147)**. Small to medium-sized. Highly variable in size and coloration; all species have a series of expanded lamellae beneath their digits. Adult males have an extendable, colorful dewlap on the throat.

- **Family Iguanidae (p. 230)**. Large to very large, with a prominent comblike, spiny crest along the midline of the head, back, and (sometimes) on the tail; some species have whorls of spiny scales encircling the tail instead .

- **Family Phrynosomatidae (p. 238)**. Small to medium-sized, with a robust body, short tail, and blunt, short-snouted head. All their scales are heavily keeled and spine-tipped.

- **Family Polychrotidae (p. 245)**. Medium-sized, slender, and with an exceedingly long tail. Has uniquely cone-shaped eyes, much like those of a chamaeleon.

Iguanid lizards include some of the most attention-grabbing lizards in Costa Rica, such as *Ctenosaura similis* (top), but also species that are true masters of camouflage, like *Corythophanes cristatus* (bottom).

Family Corytophanidae
(Casque-headed Lizards)

This small family of nine species in three genera is restricted to Central and northern South America. Costa Rica is home to four species of casque-headed lizards in two genera; three species of basilisk (genus *Basiliscus*) and the strange-looking helmeted iguana (*Corytophanes cristatus*) inhabit the lowland regions of both slopes. *Corytophanes cristatus* is an infrequently observed, secretive rainforest lizard, whereas the basilisks are conspicuously present along almost any lowland stream or river. Basilisks are famously known for their ability to run across the water surface on their hind legs, earning them the nickname "Jesus Christ lizards."

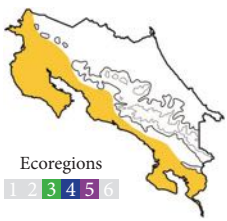
One of the most characteristic features of this group is a bony casque, or sail-like crest, on the head and neck. Typically, the lizards in this family have a compressed body and long, slender limbs; the tail is very long and can measure up to three times the combined length of the body and head. Most of these morphological traits are adaptations to life in trees and bushes. All members of the family Corytophanidae are excellent climbers, and they are usually found in trees or low bushes.

Basiliscus basiliscus

Brown Basilisk (*Basiliscus Café*)

Least concern

A large lizard with long legs and a long tail. Olive-brown, with two lateral light stripes on each side of the body, and a pattern of dark crossbands on the body and tail. Adult males have a prominent crest on the head, and sail–like crests on the back and tail; these are less developed or absent in females and smaller juveniles. Typically found near streams and rivers on the Pacific slope. Standard length to 9.8 in (250 mm) in males, total length to 35.4 in (900 mm); females considerably smaller.



Basiliscus basiliscus inhabits the Pacific slope, from extreme southwestern Nicaragua into northern South America, and is also found on the Atlantic slope of central Panama; from near sea level to 3940 ft (1200 m).

Natural history

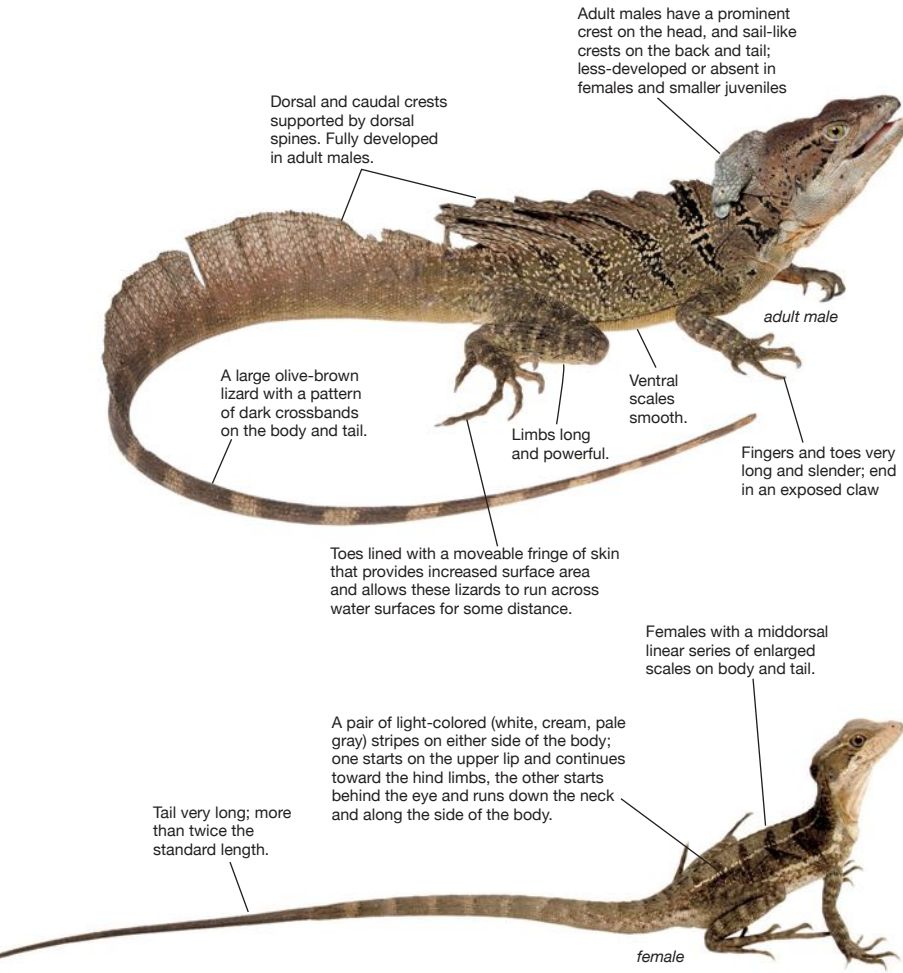
Basilisus basiliscus is similar in biology and habitat preference to *Basiliscus plumifrons*; both species are generally found on vegetated banks of lowlands streams and rivers. When disturbed, *Basiliscus basiliscus* usually runs away on its hind legs, crossing water almost as readily as dry land. Moveable flaps of skin that line its toes fold out when the foot presses down on the water surface and create an increased surface area; this feature, combined with the ability to run quickly, enables these lizards to run across the surface of water some distance before sinking. In a study on the movement of these lizards, the average speed measured for a basilisk running on water was 5.2 mph (8.4 kph), only slightly slower than their running speed on land. Both juveniles and adults were able to reach similar running speeds, but the lower body weight of juveniles enabled them to cover a greater distance over water. Large basilisks tend to run a short distance on the water surface before partially submerging, at which point they begin swimming. Generally, basilisks escape into the water to avoid land-bound predators. The fact that they tend to minimize time in the water, suggests they may also be wary of aquatic predators such as crocodilians.

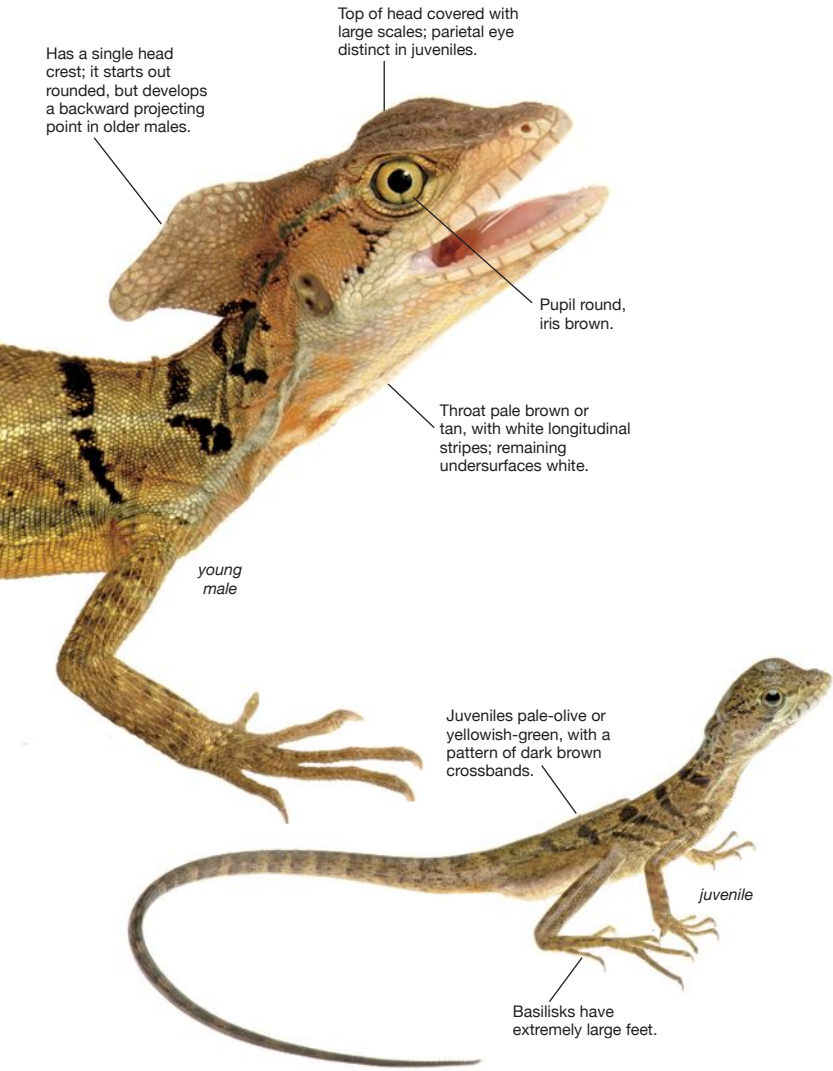
Basiliscus basiliscus has an extremely varied diet and feeds on insects, scorpions, shrimp, and small vertebrates such as lizards, snakes, fish, mammals, and birds. Its diet is supplemented with vegetable matter such as flowers, fruits, and buds.

In the dry Guanacaste area, the reproductive season lasts for approximately 10 months of the year and temporarily halts during the driest months. Adult females reach sexual maturity about 1.5 years after they hatch. During the breeding season, they produce several clutches of 2–18 eggs; larger females produce bigger clutches than smaller individuals. Eggs hatch after about 3 months; there is no parental care and young must fend for themselves immediately. Only about 60% of the hatchlings survive their first year due to the wide variety of predators that feed on young basilisks.

Young males are sexually mature at about one year of age, but mating is generally the privilege of older, dominant males, who actively defend the females within their territory against young competitors. Therefore, young males often do not reproduce until they are able to establish dominance themselves, which may not happen until they reach an age of 3 or 4 years. In nature, *Basiliscus basiliscus* can reach a maximum age of roughly 7 years, although a lifespan of 4–6 years is probably more typical.

Description





Similar species

- *Basiliscus vittatus* (p. 142) is very similar, but smaller. It is found near rivers on the Atlantic slope of Costa Rica; there is no range overlap.
- *Basiliscus plumifrons* is similar in size and morphology but is bright emerald green, without light lateral stripes.
- *Anolis oxylophus* (p. 206) may be confused with juvenile *Basiliscus* but has only a single light-colored lateral stripe.
- *Corytophanes cristatus* (p. 144) is a forest interior species without sail-like dorsal or caudal crests.

Basiliscus plumifrons

Green Basilisk (*Basiliscus Verde*)

Least concern

A large lizard with long legs and a long tail. Emerald green, with piercing yellow eyes and sail-like crests on the head, back, and tail. Adult males unmistakable; in females and immature animals, crests are smaller and less prominent; absent altogether in small juveniles. Standard length in adult males to 9.8 in (250 mm), total length can exceed 35.4 in (900 mm); females considerably smaller. Typically found near streams and rivers.

Basiliscus plumifrons occurs along the Atlantic coast, from southern Honduras to western Panama, and is also found in the Golfo Dulce region of Pacific southwestern Costa Rica and adjacent Panama; near sea level to 2550 ft (780 m).

Natural history

Basiliscus plumifrons is commonly seen on the banks of most lowland rivers in its range. It is more arboreal than other basilisks, and generally perches on logs, rocks, and bushes; it is also often seen on the sloping banks of rivers. Adults tend to prefer areas shaded by trees and bushes in order to remain somewhat hidden from view; juvenile *Basiliscus plumifrons* are less averse to open areas than adults, and are often seen basking on rocks or logs on sunny days.

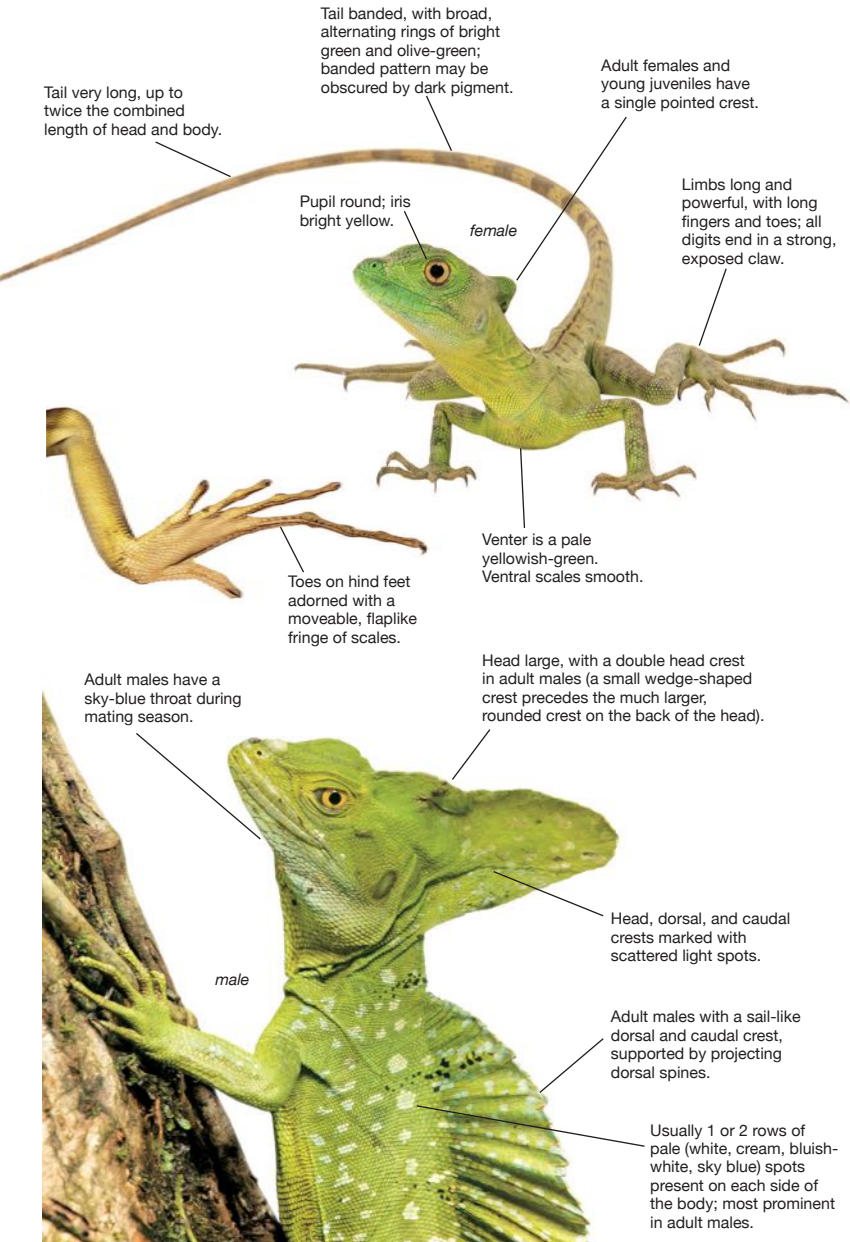
When approached from afar, these lizards initially remain motionless; but when approached too closely, they launch themselves into the water, or sometimes into dense vegetation. Like all basilisks, *Basiliscus plumifrons* can run a considerable distance across the surface of water on its hind legs. Moveable flaps of skin on the sides of each toe increase the surface area of the feet. This special foot structure, combined with the lizard's fast running speed, allows them to cross small bodies of water without sinking. Basilisks are also excellent swimmers, and they often escape simply by swimming away. Juveniles that were observed basking on large boulders in a forest stream escaped by diving into the water and clinging to the underside of rocks, hiding in air pockets. One individual remained in its submerged hiding spot for more than two hours before re-emerging.

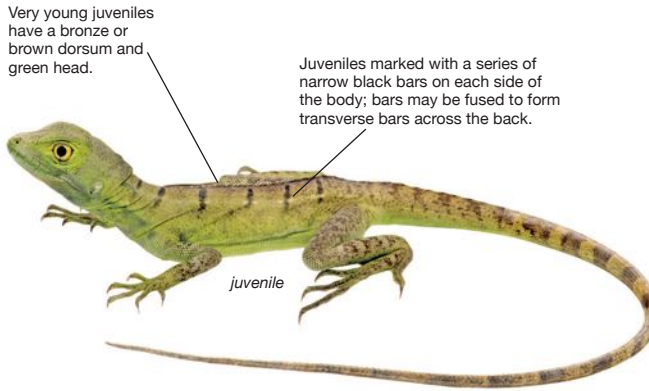
Hatchlings and small juveniles can be seen almost year-round, indicating that this species has a protracted breeding season. Females lay 4–17 eggs in a shallow depression in the soil, and the eggs hatch after an incubation period of 2–3 months.

Like its relatives, *Basiliscus plumifrons* mainly feeds on insects and other arthropods, including crabs and shrimp. Large individuals are known to occasionally eat vertebrates such as small lizards and fish; in one observation, an individual ate a bat. In captivity, individuals have lived more than ten years, although their maximum age in nature is probably considerably lower.

Basiliscus plumifrons are adept climbers. They are often found high up in trees.

Description





Similar species

- *Iguana iguana* (p. 236) has a prominently enlarged round scale below its tympanum and its crests are comprised of individual enlarged scales, not a sail-like structure supported by bony rays.
- *Basilicus basiliscus* (p. 136) and *Basiliscus vittatus* (p. 142) are similar in body shape but have a dark olive-brown coloration and paired lateral light stripes.
- Other green lizards that resemble juvenile *Basiliscus plumifrons* (e.g., *Corytophanes cristatus*, *Polychrus gutturosus*, and *Anolis biporcatus*) lack dorsal and caudal crests.

Basiliscus vittatus

Least concern

Striped Basilisk (*Basiliscus Rayado*)

A medium-sized to large lizard. Olive-brown, with two lateral light stripes on each side of the body, and a pattern of dark crossbands on the body and tail. Adult males have a pointed, triangular crest on the head, a low sail-like crest on the back and only a serrated row of enlarged scales on the tail's midline; these features are less developed or absent in females and smaller juveniles. Typically found near streams and rivers on the Atlantic slope. Standard length to 6.7 in (170 mm) in males, total length to 23.2 in (590 mm); females considerably smaller.

Basiliscus vittatus ranges widely, from Jalisco and Tamaulipas, Mexico, to northwestern Panama. It occurs along both slopes throughout most of Central America but is absent from the Pacific slope of Costa Rica; near sea level to 4925 ft (1500 m).

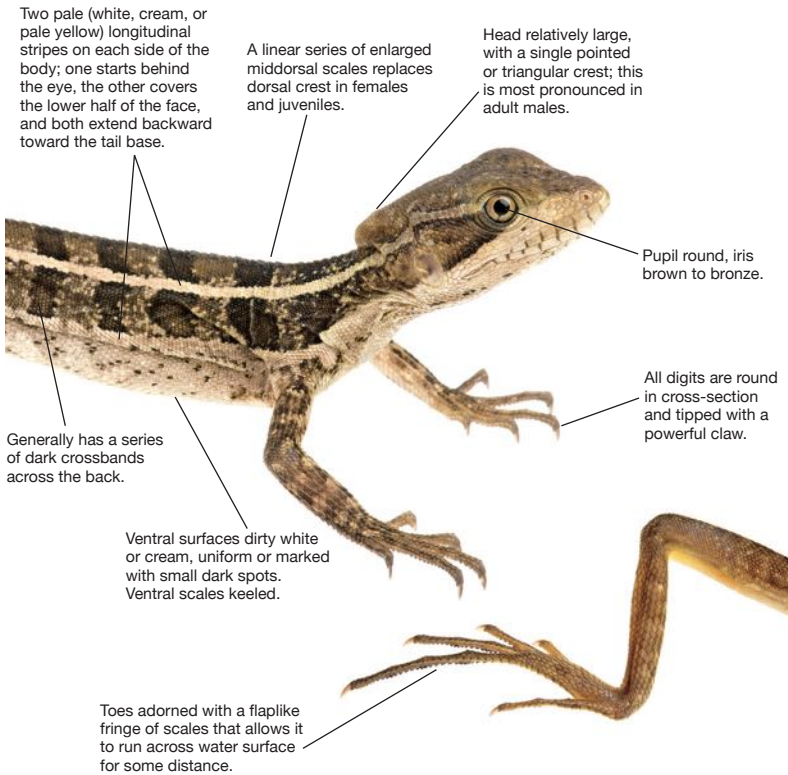
Natural history

Basiliscus vittatus is the most terrestrial of all *Basiliscus* species and is often found a considerable distance from water. It prefers open places such as farms, plantations, and areas with scrubby vegetation, and is commonly seen in the vegetation bordering sandy beaches. Basilisks are active hunters, and juveniles especially are often seen chasing insects and other invertebrates. They are also known to consume considerable quantities of plant matter. In coastal areas, the diet of these lizards often includes a significant portion of terrestrial crustaceans such as land crabs.

Basiliscus vittatus is strictly diurnal and not easily approached; when threatened, it will hide under debris or in burrows, and it is less likely to climb trees than other species of *Basiliscus*. It is also capable of bipedal movement and, when startled, often runs long distances away from the source of the threat on its hind legs only. Like other basilisks, it uses this bipedal motion and its specialized, moveable foot scales to run considerable distances across the surface of water to escape predators. At night, these lizards hide in or under debris piles or climb into low bushes and trees and sleep exposed on leaves or branches that overhang water. When the vegetation that holds a sleeping lizard is disturbed by an approaching predator, it wakes up and immediately drops down into the water below.

Basiliscus vittatus is oviparous. During each annual breeding season, females are reported to produce at least 4 clutches of eggs. Each clutch contains 2–18 eggs. Most reproductive activity starts during the second half of the dry season; the majority of juveniles hatch at the beginning of the rainy season, which coincides with the period of highest insect density.

Description



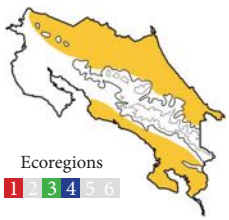
Similar species

- *Basiliscus basiliscus* (p. 136) is larger, has a rounded head crest, and is geographically isolated (occurs on Pacific slope only).
- *Basiliscus plumifrons* (p. 139) has a brilliant green coloration, without lateral light stripes.
- *Anolis oxylophus* (p. 206) might be confused with juvenile *Basiliscus* but it has only a single light-colored lateral stripe.
- *Corytophanes cristatus* (p. 144) is a species of forest interiors, without sail-like dorsal or caudal crests.

Corytophanes cristatus
Helmeted Iguana (*Perro Zompopo*)

Least concern

A medium-sized lizard with spindly legs and a long tail. Has a prominent helmetlike crest on its head; this crest continues as a saw-toothed ridge along the middle of the back and ends at the base of the tail. The top of the head has a diamond-shaped depression bordered by bony ridges. Maximum standard length to 4.7 in (120 mm); total length to 14.2 in (360 mm).



Along the Atlantic slope, ranges from Veracruz, Mexico, to northern Colombia; on the Pacific slope, it ranges from northwestern Costa Rica to northern Colombia. Near sea level to 5380 ft (1640 m).

Natural history

Corytophanes cristatus is a common, albeit infrequently seen, species. It is an extreme sit-and-wait predator that spends most of its time motionlessly waiting for suitable prey to pass by. These lizards eat a wide variety of insects and spiders, but seem to prefer very large katydids, grasshoppers, and caterpillars. They are also known to occasionally eat small anole lizards; all prey items are grabbed with a rapid lunge.

This species can change its color rapidly, and individuals tend to be extremely cryptic; their dorsal coloration closely matches their habitat's hues, with variable dark and light spots, blotches, and bands breaking up the outline of the animal's body shape. When this lizard sits motionless in its natural environment, it looks very much like a dry branch spotted with lichens. If threatened, or otherwise stressed, *Corytophanes cristatus* usually darkens its color pattern to very dark olive-gray or brown, and sometimes almost looks black.

In very wet habitats, individuals sometimes have liverworts, mosses, or algae growing in the depression on the top of their head. The limited movements of these lizards, combined with the retention of moisture on the head, can enable epiphytic vegetation to germinate and temporarily settle until the lizard sheds its skin again. This added living plant matter perfects the already impressive camouflage of *Corytophanes cristatus* and renders it very difficult to detect by predators.

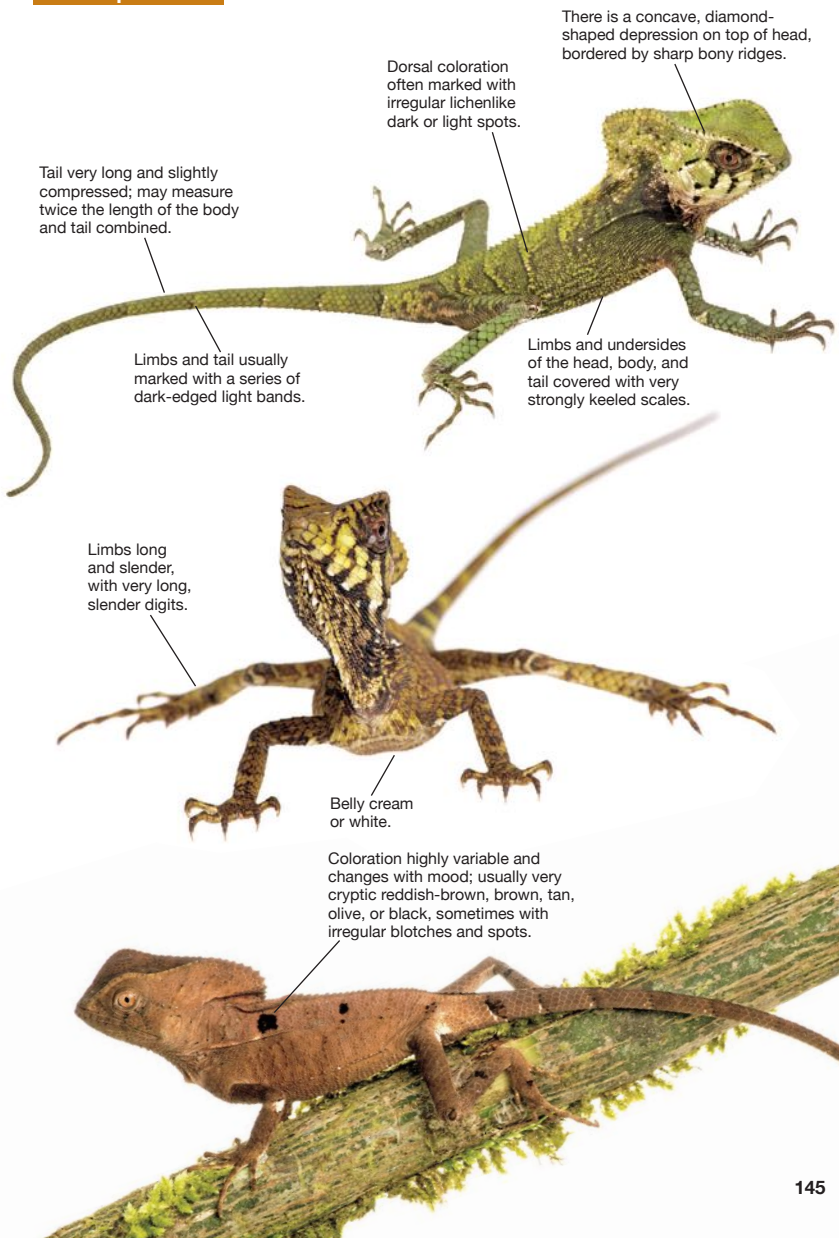
When threatened, this species displays a repertoire of defensive actions, ranging from playing dead to expanding the nuchal crest and dewlap, while compressing the body, to appear larger in the eyes of the predator. Individuals sometimes gape and lunge forward with the mouth open; this is generally to feign an attack, but sometimes they do bite. *Corytophanes cristatus* is capable of short bipedal sprints during which they use the long tail as a counterbalance, and individuals have been observed to launch themselves off their perch and run away from perceived danger. This species does not seem to be able to autotomize its tail as an antipredator strategy.

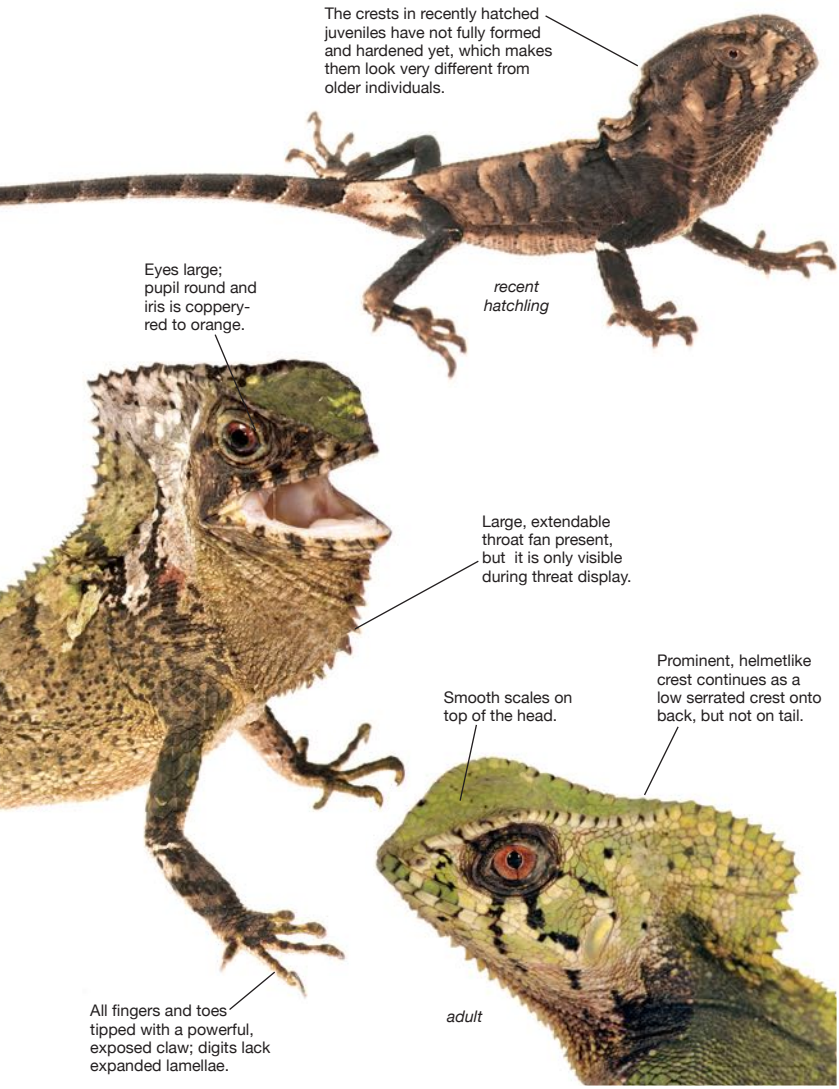
Corytophanes cristatus is oviparous; reproduction probably takes place year-round. Females apparently are capable of sperm retention for a prolonged periods of time after mating. Because of their low population density and stationary lifestyle, male and female encounters are probably infrequent. Sperm storage enables

Some individuals have plants growing on their head.

the female to lay fertilized eggs whenever specific environmental or bodily conditions are ideal, regardless of whether a mate is at hand. Females lay their eggs in a nest that is excavated in the forest floor. Nests are 2–3.9 in (50–100 mm) in diameter, and 5 or 6 eggs are laid per clutch. Female *Corytophanes cristatus* have been observed with soil in the depression on top of their head, suggesting that the ridged top of the head is used as a shovel to excavate the nest.

Description





Similar species

- *Basiliscus* species (pp. 136–143). have a bony crest on the head but lack a serrated crest on the back and a serrated ridge on the throat.
- *Anolis capito* (p. 161) lacks a serrated crest.
- *Polychrus gutturosus* (p. 246) lacks a serrated crest.

Family Dactyloidae
(Anoles)

As currently understood, the family Dactyloidae comprises a single genus, *Anolis*, which contains 426 species. The taxonomy of the anoles has long been a tenuous affair. They were once included in the family Iguanidae and later the family Polychrotidae. On the genus level, anoles were divided into several different genera until recently. The 38 species of Costa Rican anoles currently placed in the genus *Anolis* were previously distributed over four different genera (*Anolis*, *Ctenonotus*, *Dactyloa*, and *Norops*).

Lizards in the genus *Anolis* are among the most common reptiles in any part of Costa Rica; at least one species is usually present in all but the most urbanized areas. All members of this family are small to medium-sized and have long limbs, a slender body, and a long tail. Anoles have broadly expanded toes and fingers that end in a narrow tip with a long claw. Most species are arboreal and inhabit various kinds of vegetation, from the twigs of low bushes to the trunks and canopy of some of the rainforest's largest trees. All species lay eggs; in most cases, one egg is produced every few weeks, year-round.

Males of all species of *Anolis* have an extendable dewlap on the throat that is often uniquely colored. In some species females also have a dewlap, but it is usually smaller and occasionally even a different color than the male's dewlap. Low, indistinct crests may be present on the tail in some species; more commonly, males of some anole species have a low nuchal crest that is erected during courtship or territorial interactions. Generally, males are larger than females. The sexes are also distinguished by the swollen appearance of the tail base in males, marking the location of the reproductive organs. Autotomy is common in anoles and many adult individuals have a partly regenerated tail, testimony to the important place in the food web that these common lizards occupy.

Costa Rican *Anolis* at a Glance

This is a brief visual key to the various species groups of Costa Rican members of the genus *Anolis*, highlighting key scalation, distribution, and habitat characteristics.

Cloud forest anoles
(*alocomyos*, *benedikti*, *leditzigorum*, *pachypus*, *tropidolepis*)

Common; isolated on mountains throughout Costa Rica. Found on ground and shrubs. ID: Alternating dark and light stripes radiate outward from the eye onto the head and neck.

Highland anoles
(*altae*, *carpenteri*, *kemptoni*, *monteverde*, *tenorioensis*)

Uncommon; occur at middle elevations of various mountain ranges, as well as in Atlantic lowlands (*carpenteri*). Found on shrubs, twigs, and possibly in canopy. ID: Nondescript. Small and slender, with very short limbs. Coloration relatively uniform pale above, lighter below; usually with uniform light-colored lips and throat.

Stream anoles
(*aquaticus*, *oxylophus*)

Common; occur in lowlands of both slopes. Found on stream rocks and nearby twigs. ID: Strikingly colored, with contrasting stripes and ocelli; streamside habitat is a good clue to identification.

Lichen anoles
(*charlesmyersi*, *fungosus*, *pentaprion*, *salvini*)

Uncommon to rare; occur in lowlands of both slopes, at middle elevations and highlands. Found on shrubs, twigs, and in canopy. ID: Lichenlike, mottled, pale coloration is unique.

Giant canopy anoles
(*frenatus*, *ibanezi*, *insignis*, *microtus*, *savagei*)

Rare; occur in lowlands and foothills along both slopes, in undisturbed wet forest. Found on trunks and in canopy. ID: Very large species that inhabit tree trunks and canopy branches, usually high overhead. Body often marked with alternating dark and light diagonal bands.

Ground anoles
(*humilis*, *marsupialis*)

Common; occur in lowlands of Atlantic slope and in south Pacific. Found on ground and low on trunks. ID: Small and brown, with a distinct, broad middorsal band of greatly enlarged scales.

Canopy anole
(*Anolis lemurinus*)

Uncommon; occurs in wet forests in Atlantic and Pacific lowlands and foothills. Found on shrubs, twigs, and in canopy. ID: Highly variable, difficult to identify. Black and white dewlap scales are a good field mark.

Southwestern anoles
(*osa*, *polylepis*)

Abundant; occur in southern Pacific lowlands and some foothill locations. Found on low shrubs and twigs. ID: Note light stripe on the flanks and huge (usually orange) dewlap.

Green tree anole
(*Anolis biporcatus*)

Common; widespread in lowlands of both slopes. Found on twigs, trunks, and in canopy. ID: Large and has short limbs. Bright green coloration, with white undersides. Dewlap pale blue and red.

Pug-nosed anole
(*Anolis capito*)

Common; occurs in wet forests in Atlantic and Pacific lowlands and foothills. Found on ground (juveniles), twigs, and on trunks. ID: Has cryptic coloration and unique short-snouted profile.

Puerto Rican crested anole
(*Anolis cristatellus*)

Common on Atlantic coastal plain. Found on twigs and man-made structures. ID: Sail-like crest on body and tail.

Slender anoles
(*cryptolimifrons*, *limifrons*)

Common on both slopes, in lowland forest interiors. Found on twigs. ID: Extremely slender; white below (including lips and throat), tan or gray above; banded tail.

Mountain anoles
(*datzorum*, *laeviventris*)

Uncommon to rare; occur in highlands. Found on twigs, trunks, and possibly in canopy. ID: Enlarged white tubercles interspersed with flank scales.

Cuban brown anole
(*Anolis sagrei*)

Recently introduced, may be spreading; occurs on Atlantic coastal plain, near ports. Found on ground and shrubs. ID: Coloration much like that of ground anoles, but it is larger and lacks middorsal band of enlarged scales.

Dry forest anoles
(*cupreus*, *unilobatus*)

Common; only occur in dry Pacific northwest. Found on shrubs and trunks. ID: Relatively nondescript, except for dewlaps. Dewlap of *unilobatus* is yellow, with a blue central spot; dewlap of *cupreus* is very large, with pink and orange smudges.

Blue-eyed anole
(*Anolis woodi*)

Uncommon; isolated populations occur in middle-elevation cloud forests. Found on twigs, trunks, and possibly in canopy. ID: Has blue eyes and light spots below each eye.

Cocos Island anole
(*Anolis townsendi*)

Cocos Island only. Found in low shrubs and twigs. ID: Only anole on Cocos Island; not found on mainland.

Anolis alocomyos
Talamanca Cloud Forest Anole

Least concern

A stocky, medium-sized anole. This species is placed in the *Anolis pachypus*-complex; it is nearly indistinguishable from related species on the basis of morphology alone. The species that comprise this complex have a dark bar across the head between the eyes, and a light stripe emanating from behind the eye, past the corner of the mouth and onto the neck. On male *Anolis alocomyos*, the dewlap is uniform purplish-red with white scales; female dewlap small and white. Standard length to 1.9 in (49 mm) in males, 2.1 in (54 mm) in females; total length to 6.1 in (155 mm).

Anolis alocomyos appears to have a limited distribution on the Pacific slope of the Talamanca highlands, primarily in the Santa María de Dota Valley and the San Gerardo de Dota Valley, but possibly also in the Escazú highlands; 5645–8335 ft (1720–2540 m).

Natural history

Anolis alocomyos is a cryptic species in the *Anolis pachypus*-complex. On the basis of external morphology alone, it is virtually indistinguishable from the closely related species *Anolis leditzigorum* and *Anolis tropidolepis*; it differs from those two species in molecular traits and in hemipenis morphology. These three species differ from the remaining two Costa Rican species in the *Anolis pachypus*-complex (*Anolis benedikti* and *Anolis pachypus*) in having a solid purplish-red dewlap with white scales.

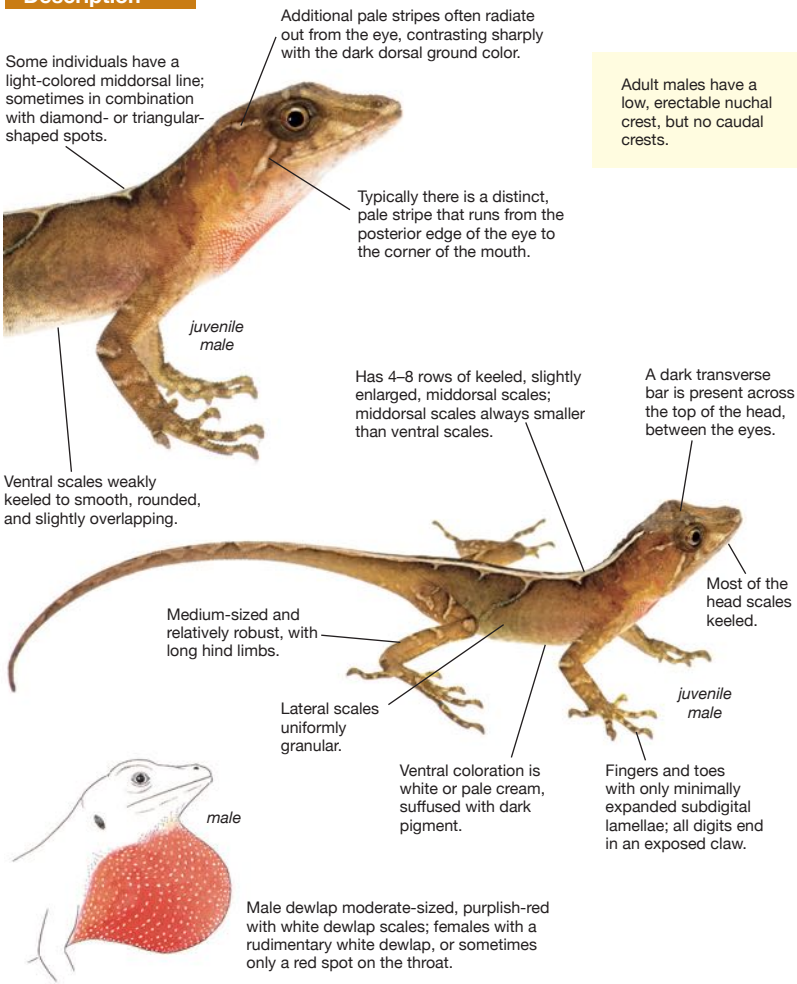
This recently described species (2014) has a relatively small, well-defined geographic distribution range; although it may not be possible to identify it accurately under field conditions, an identification can at least be surmised based on external morphology and distribution.

Being highland lizards, the members of this complex form isolated populations in various mountain ranges, separated from one another by uninhabitable lowland areas. This physical and genetic isolation can, over time, lead to the formation of genetically different species that still share many morphological and physiological traits, because each population is still subject to similar environmental conditions.

Anolis alocomyos is not uncommon within its preferred habitat. During the day, if weather conditions are ideal, these lizards can be seen basking on low vegetation and in sun-exposed spots on the ground, on logs, or rocks. At night, they sleep exposed on the upper surface of leaves or twigs, generally within 2–3 ft (60–90 cm) above the ground. During periods of low temperatures, rain, fog, or strong winds, these lizards remain hidden in burrows or under cover objects until conditions improve, which sometimes takes days. Since its identity can be difficult to ascertain in the field, little information exists that pertains specifically to *Anolis alocomyos* and further study is needed to better understand its biology.

When weather conditions are suitable, *Anolis alocomyos* can be seen perched on rocks, logs, and at low points on tree trunks.

Description



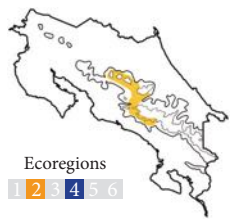
Similar species

- *Anolis pachypus* (p. 208) may co-occur locally; it is very similar in appearance, but males have a reddish-orange dewlap with a large, yellow central spot.
- *Anolis tropidolepis* (p. 224) is found near *Anolis alocomyos*; they cannot reliably be told apart in the field.
- *Anolis leditzigorum* (p. 190) cannot be reliably told apart from *Anolis alocomyos* in the field.
- *Anolis laeviventris* (p. 188) co-occurs but differs in having heterogeneous flank scales that have enlarged tubercles mixed in; males have a white dewlap and a nuchal crest.

Anolis altae
Highland Anole

Least concern

A somewhat nondescript, medium-sized highland anole with a relatively slender body and head, and very short limbs. It lacks crests and conspicuously enlarged middorsal scale rows. Fairly uniform gray, tan, or reddish-brown, with a white upper lip area and an indistinct, pale lateral stripe. Male dewlap medium-sized and rust-orange, grading to yellow on free margin; females lack a dewlap. Standard length to 2.0 in (52 mm) in males, and 1.8 in (47 mm) in females; total length to 6.1 in (156 mm).



Anolis altae is a Costa Rican endemic that inhabits intermediate elevations of the Central Mountain Range and the north end of the Talamanca Mountain Range, at least as far south as Mount Chirripó; 4000–7220 ft (1220–2200 m).

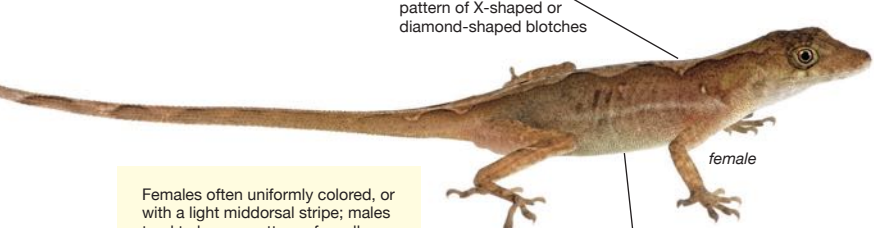
Natural history

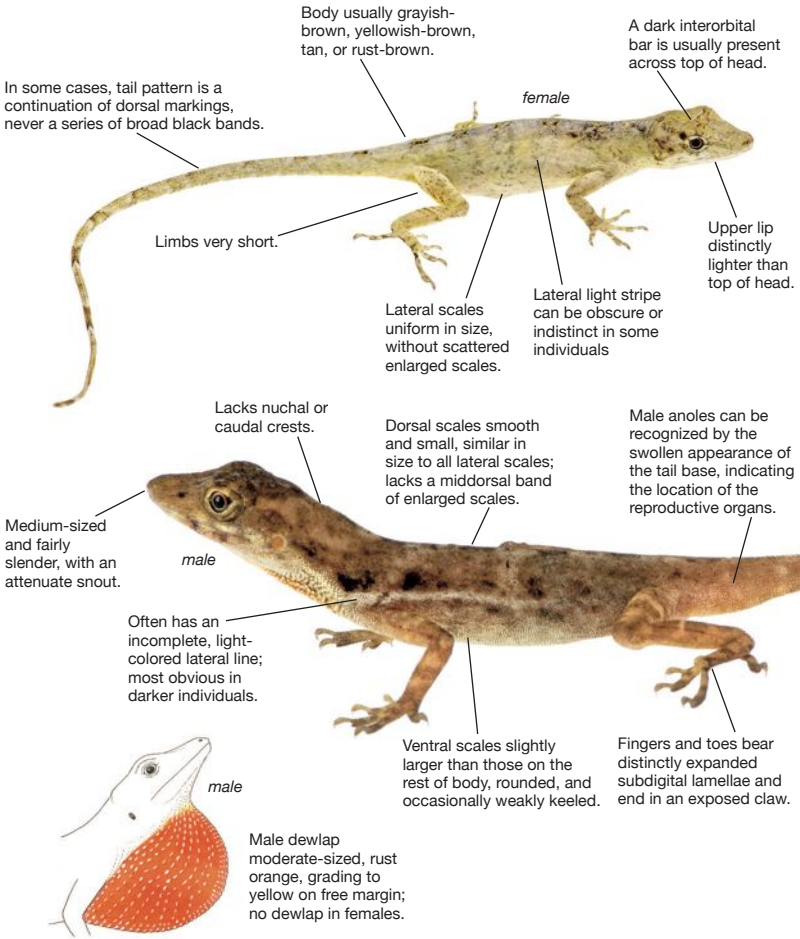
Anolis altae is rather uncommon and its biology is poorly known. This small, diurnal species is mostly terrestrial, although, when hunting for prey, it does regularly climb into small bushes or ascend onto the lower section of tree trunks. At night, these lizards can be found sleeping on small twigs in shrubby vegetation, to a height of about 10 ft (3 m) above the ground. If weather conditions are not conducive to sleeping in exposed spots on vegetation (e.g., during rainy or windy conditions), they sleep elsewhere, presumably in the leaf litter or in a burrow.

This is a species of humid cloud forest and lower montane forest habitats. It does seem moderately tolerant of habitat alteration, and can also be found in gardens, parks, and along roadsides, so long as adequate vegetation cover persists.

In recent years, several regional populations previously thought to be included in *Anolis altae* have been split off; populations from the Tilarán Mountain Range are now considered to be *Anolis monteverde*, whereas Tenorio Volcano has an endemic form, *Anolis tenorioensis*. Additional cryptic species may be included in the remaining *Anolis altae* of the Central and northern Talamanca mountain ranges. A variety of this species reportedly also occurs on Cacao Volcano, in Guanacaste, but it is unclear whether it is *Anolis tenorioensis*, which occurs nearby, or a different form altogether. Additional research is needed to clarify this situation.

Description





Similar species

- *Anolis carpenteri* (p. 163) has an overall grayish-green dorsal coloration and uniformly orange dewlap.
- *Anolis kemptoni* (p. 186) differs in male dewlap coloration and hemipenis morphology; it is restricted to the extreme southern Talamanca Mountain Range.
- *Anolis monteverde* (p. 202) differs in male dewlap coloration and hemipenis morphology; it is restricted to the Tilarán Mountain Range.
- *Anolis tenorioensis* (p. 220) differs in ventral coloration and male dewlap coloration; it is geographically restricted to Tenorio Volcano, in the Guanacaste Mountain Range.
- *Anolis laeviventris* (p. 188) has heterogeneous flank scales interspersed with enlarged tubercles; male dewlap is white.

Anolis aquaticus
Water Anole

Least concern

Found only near streams bordered by vegetation. A strikingly patterned, blue-eyed anole. Body, tail, and limbs with broad dark transverse stripes on a light greenish-gray to pale yellow background; has a bold, light-colored face stripe and lateral stripe. Male dewlap large; has dark orange background with pale orange to yellow oblique stripes and white scales. Standard length to 2.8 in (71 mm) in males, 2.4 in (62 mm) in females; total length to 7.5 in (190 mm).

Anolis aquaticus inhabits the Pacific slope of southwestern Costa Rica and adjacent western Panama; near sea level to 3840 ft (1170 m).

Natural history

Anolis aquaticus is quite common in its preferred habitat, but it has a very localized, disjunct distribution pattern that is determined primarily by the availability of suitable stream habitat. *Anolis aquaticus* inhabits the steep, vertical banks and associated riparian vegetation along fast-flowing streams in densely forested valleys. It lives near and in the water, usually perched on rocks or logs within a few yards of the water's edge.

Upon discovery, individuals hide by moving to the back of a branch or stem, away from the source of the threat. This is a tactic used by many anoles. If it does not work, the lizard may run away along the stream bank and retreat into a crevice or hole. Individuals often dive into the water and hide in depressions in the stream bed, or inside holes in the river bank.

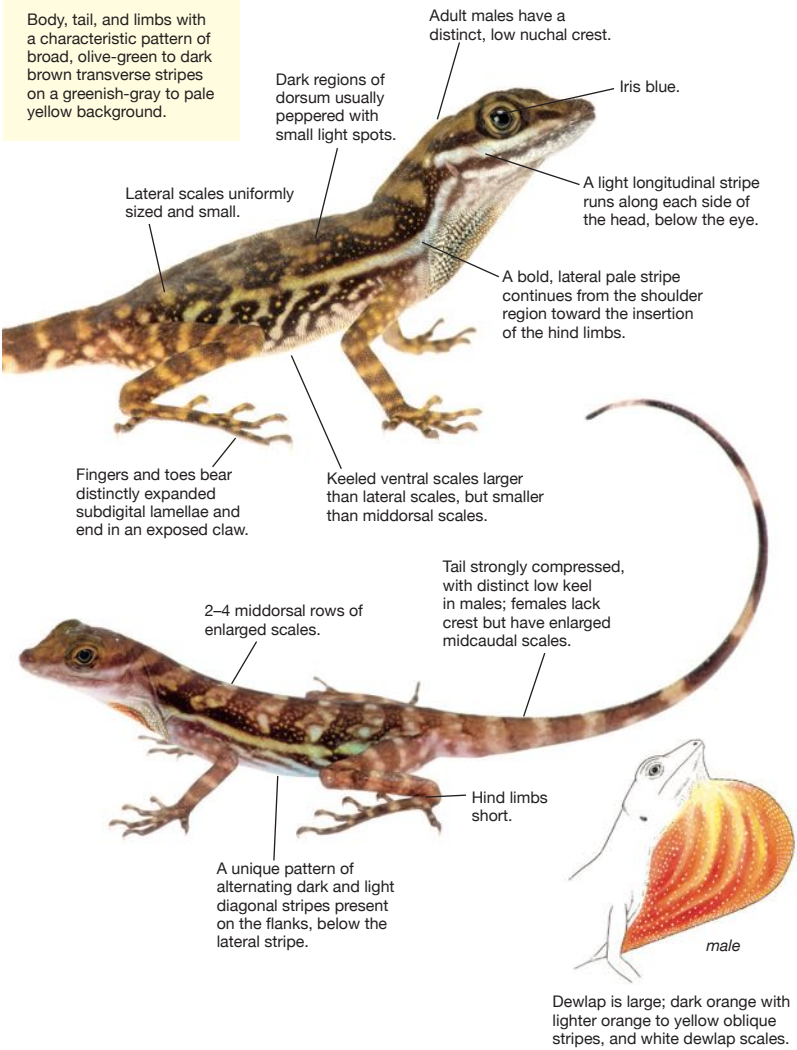
These lizards tend to shy away from direct exposure to sunlight and do not tolerate high temperatures. Adults are often seen sleeping on rocky ledges or in crevices in the spray zone of waterfalls, with their body covered in water droplets.

Anolis aquaticus is an insectivore and preys on small invertebrates.

Juveniles generally show bolder colors than adults.

Description

Body, tail, and limbs with a characteristic pattern of broad, olive-green to dark brown transverse stripes on a greenish-gray to pale yellow background.



Similar species

- *Anolis oxylophus* (p. 206) lacks brown transverse bands on its sides; instead, it has a pattern of dark-outlined white ocelli. Dewlap very large and uniformly yellow-orange.

Anolis benedikti

Benedikt's Cloud Forest Anole

Not assessed

A stocky, medium-sized anole in the *Anolis pachypus*-complex; nearly indistinguishable from related species by morphology alone. As a group, recognized by the dark bar across the head between the eyes, and by a light stripe emanating from behind the eye, running past the corner of the mouth and onto the neck. *Anolis benedikti* male dewlap moderate in size, red with a yellow anterior portion and yellow margin; female dewlap small and white. Standard length to 1.9 in (49 mm) in both sexes; total length to 6.1 in (155 mm).

Anolis benedikti occurs in the extreme western section of the Talamanca Mountain Range in western Panama and is also found in the border region with Costa Rica, in the Las Tablas area and on the north slope of Cerro Pando, from 5415–7840 ft (1640–2390 m).

Natural history

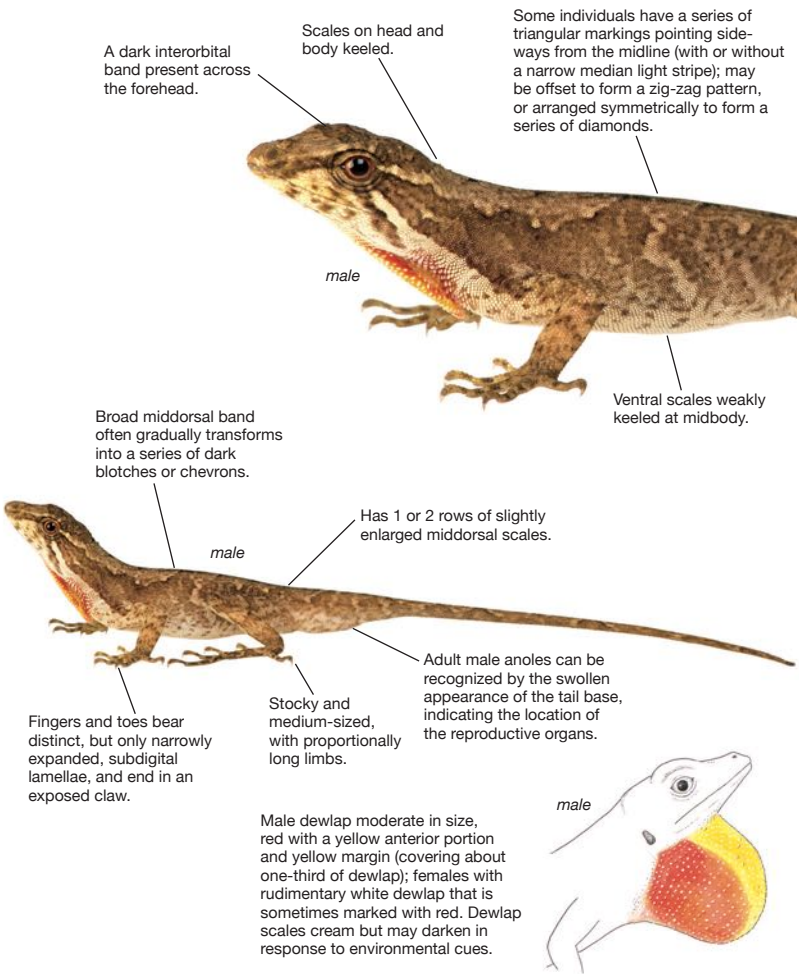
Anolis benedikti is closely related to the more widespread species *Anolis pachypus*. In Costa Rica, it occurs at high elevations on the Atlantic slope of the Talamanca Mountain Range; near the border with Panama, it spills over onto the Pacific slope. Access to the Atlantic slope of these high peaks is very limited, and this species is undoubtedly more common than current observations suggest. In the small area above Las Tablas, where *Anolis benedikti* occurs on the Pacific slope, its range almost overlaps with that of *Anolis pachypus*, and both species virtually live side by side, with *Anolis benedikti* occupying higher elevations.

Not only do these two anoles appear identical in their morphology, limited observations indicate that their habitat choice and biology are very similar. Individual *Anolis benedikti* were seen on the ground and on low perches such as logs and fence posts in a habitat formed by a mosaic of forest fragments and open pasture. Vast areas of uninterrupted primary forest protected within the La Amistad International Park are nearby. During the day, individuals were seen in relatively open areas with considerable sun exposure, generally associating with low bushes or isolated trees. Reports of this species in more forested areas indicate it also demonstrates a preference for clearings within those forests. At night, sleeping individuals were encountered at the forest edge, often along stream corridors. *Anolis benedikti* sleeps on low vegetation, generally less than 7 ft (~2 m) above the ground. When ascending above 6500 ft (2000 m) in the extreme southern Talamanca region, *Anolis benedikti* is likely the only anole one would encounter, although the diversity of anoles below that elevation can be significantly higher.

This is a newly described species that was included in *Anolis pachypus* until 2011. Based on the size of the currently known distribution range, this species would likely qualify for endangered status. Its apparent tolerance for habitat alteration and the relatively high densities of this species in converted pastures suggests that the ongoing loss of natural forest in its range may not impact *Anolis benedikti* as much as it does other highland reptiles.

Coloration variable but always cryptic. Often has an irregularly edged, broad middorsal band.

Description



Similar species

- Male *Anolis pachypus* (p. 208) have a reddish-orange dewlap with a large yellow central blotch; females are indistinguishable in the field.
- Male *Anolis humilis* (p. 179) have a red dewlap with a yellow margin; males and females have rows of greatly enlarged middorsal scales.
- *Anolis polylepis* (p. 212) is more slender and usually has a light-colored lateral stripe; males have a large orange or yellow-orange dewlap.
- Other Costa Rican members of the *Anolis pachypus*-complex (*Anolis alocomyos, Anolis leditzigorum, Anolis tropidolepis*) do not overlap in distribution range.

Anolis biporcatus
Green Tree Anole

Least concern

A large, arboreal anole with very short limbs and a long tail. Bright green overall. Adult males with an erectable nuchal crest and a red, white, and blue dewlap; females with a bluish-white dewlap. Standard length to 4.0 in (102 mm); total length to 13.0 in (330 mm).

On the Atlantic slope, *Anolis biporcatus* ranges from Chiapas, Mexico, to northern Venezuela, and on the Pacific slope from western Nicaragua and northwestern Costa Rica to western Ecuador; near sea level to 6560 ft (2000 m).

Natural history

Anolis biporcatus usually occurs singly but has been seen in pairs. This is a diurnal and strictly arboreal species. It is most frequently found in relatively undisturbed humid lowland and premontane forest, but does prefer habitat edges (e.g., along clearings, trails, or streams). Individuals perch on branches or in a vertical position on the trunk of a tree. Though generally observed at heights of 3–10 ft (1–3 m) above the ground, these lizards are excellent climbers and have regularly been found in the canopy of rainforest trees at heights of more than 100 ft (35 m). During the daytime, these lizards usually bask in spots that are exposed to direct sunlight; at night, individuals sleep on exposed branches or on the top of palm fronds, generally 10–15 ft (3–5 m) above the ground.

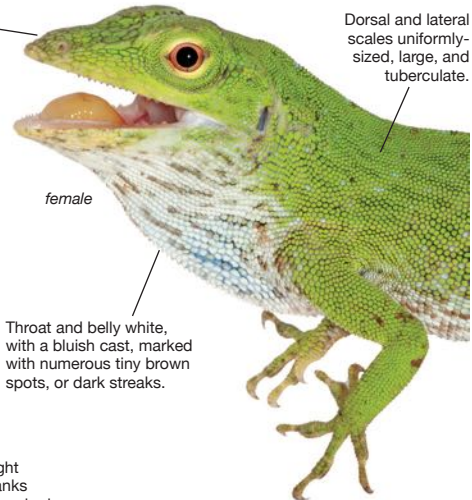
Anolis biporcatus uses its strong jaws to overpower relatively large prey. Its diet consists mainly of invertebrates—insects and spiders—but also occasionally includes small anoles. When seized, these anoles will gape and attempt to bite; their powerful bite and numerous short, sharp teeth can draw blood. Individual *Anolis biporcatus* have been reported to produce an audible squeak when handled.

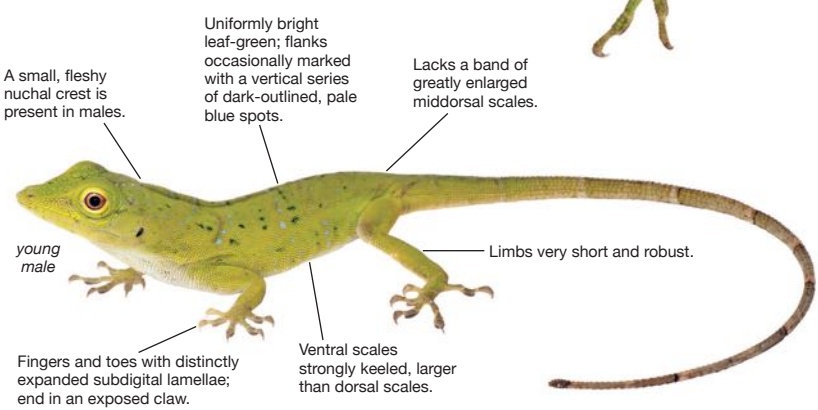
Females of this species produce multiple egg clutches each year and may breed year-round in areas with a continuously wet climate; the oviposition frequency may decrease during the driest months in areas that have a pronounced dry season. Clutches appear to consist of a single egg, but a captive female laid two consecutive eggs with a seven-hour interval. An egg of this species was found in the layer of moss covering the branch of a recently fallen tree, suggesting that eggs may be laid in the canopy; it was not possible, however, to determine at what height the branch had originally been located.

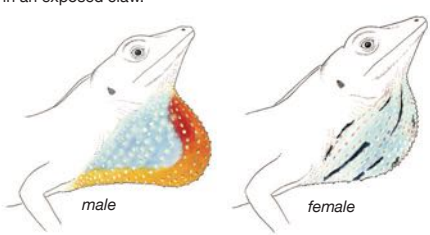
Anolis biporcatus can be quite common locally, but it is easily overlooked. Its green coloration blends in with the surrounding vegetation.

Description

Capable of dramatic color change; turns mottled dark brown with white and black spots when stressed.







Male dewlap medium-sized, with a red margin, blue center, and white base; gorgetal scales white, with dark specks. Female dewlap medium-sized also, but usually lacks the red margin.

Similar species

- *Anolis frenatus* (p. 175) has a pattern of oblique dark stripes on its flanks, comprised of series of dark oval spots; dewlap white.
- *Anolis ibanezi* (p. 182) has a long, attenuate snout and 2–4 dark oblique stripes on its flanks; dewlap orange in males, green in females.
- *Anolis woodi* (p. 228) has blue eyes.
- *Polychrus gutturosus* (p. 246) has an extremely long tail and its eyes are positioned on conical projections.

Anolis capito
Pug-nosed Anole

Least concern

A relatively large anole with a characteristically robust head and short "pug-nosed" snout. Male's dewlap small and greenish-yellow. Standard length to 3.8 in (96 mm) in females, slightly less in adult males; total length to 10.4 in (265 mm).

Anolis capito ranges along the Atlantic slope from Tabasco, Mexico, to eastern Panama, and occurs on the Pacific slope in southwestern Costa Rica and adjacent Panama; from near sea level to 5905 ft (1800 m).

Natural history

Anolis capito is a diurnal species of shaded forest interiors. It is widespread throughout Costa Rica's wet rainforest and cloud forest habitats, but is absent from drier forest types. Despite being a common species, it occurs in relatively low density; *Anolis capito* is also easily overlooked due to its excellent camouflage. Juveniles and younger individuals are most frequently observed in the leaf litter on the forest floor, or perched low on trunks and fallen logs, while adults are invariably perched vertically on trees, usually less than 10 ft (3 m) above the ground.

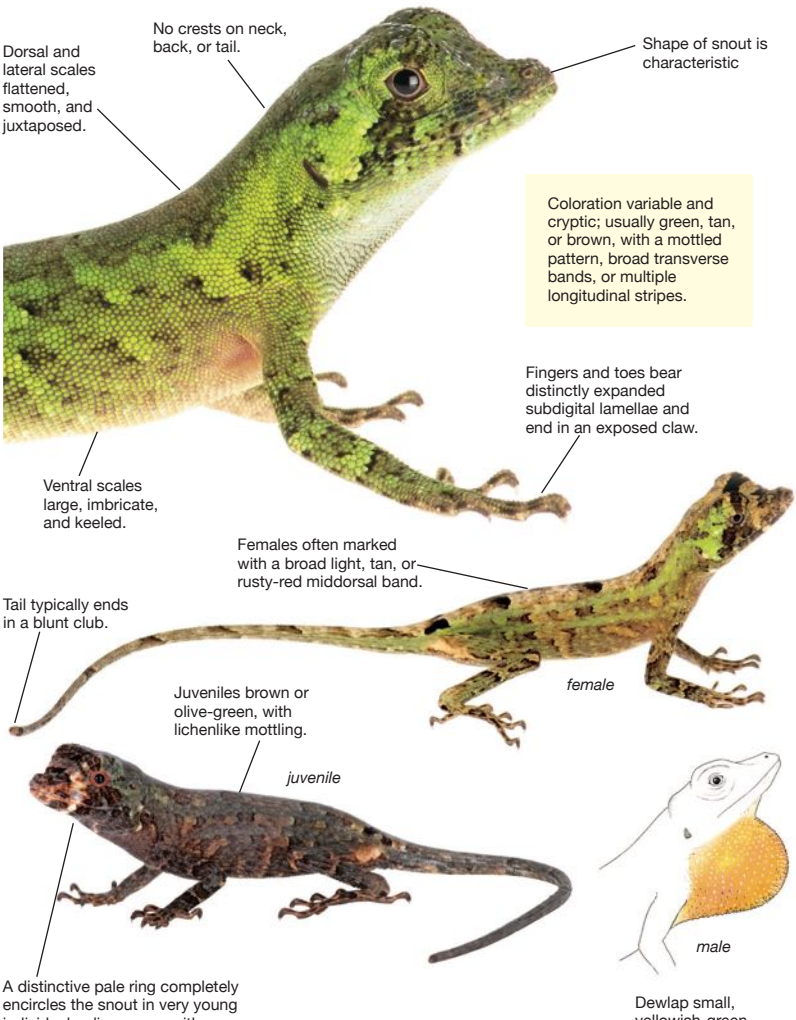
Its variable, but always highly cryptic, coloration allows this species to be an effective sit-and-wait predator; when suitable prey passes within a short distance of its perch, the lizard will dash over and catch it with its powerful jaws. *Anolis capito* is an effective predator, capable of overpowering relatively large insects, spiders, and other invertebrates, as well as smaller anoles on occasion.

Adults tend to remain still in their vertical position and press their body against a trunk when discovered. They may sidle towards the backside of their perch, away from the source of the threat. If approached too closely, they launch themselves off their perch and dash toward another tree, running across the forest floor on their hind limbs only. Juvenile *Anolis capito* have a different color pattern than adults, and closely resemble a broken stick when they hold still with their head slightly lifted above the substrate. Their head is marked with a light ring that completely encircles the snout to obscure the shape of its body; this pattern disappears as the lizard ages.

Anolis capito is oviparous and reportedly reproduces year-round; the density of juveniles appears highest during the dry season (January to March), suggesting that reproductive activity may peak during the preceding wet months.

The unique head pattern of juvenile *Anolis capito* contrasts with its dark body and snout, and helps to obscure the shape of its body from predators.

Description



Similar species

- *Corytophanes cristatus* (p. 144) has a serrated crest on its head and back.
- *Anolis humilis* (p. 179) resembles juvenile *Anolis capito*, but has a band of distinctly enlarged middorsal scales, and a red dewlap with a yellow margin.
- *Anolis woodi* (p. 228) has blue eyes.
- *Basiliscus* species (pp. 136–143) have a crest on the back of the head, have an extremely long tail, and lack a dewlap.

Anolis carpenteri
Green Slender Anole

Least concern

Small, very slender, with very short limbs, and without crests. Green overall. Dorsal coloration uniformly mottled grayish–green in males, but often with dark middorsal markings in females. Usually has a light-colored ring around each eye. Male dewlap medium-sized and bright orange; females lack a dewlap. Standard length to 1.8 in (45 mm), total length to 4.6 in (118 mm).

Anolis carpenteri is found in the Atlantic lowlands and foothills, from central Nicaragua to northwestern Panama; near sea level to 3610 ft (1100 m).

Natural history

Anolis carpenteri is a species of shaded forest interiors, generally found only in relatively undisturbed habitats. It is infrequently seen but may be underreported. Its cryptic coloration, preference for lichen-covered perches in low-light conditions, and habit of freezing in place when approached make it difficult to detect. Most individuals are observed on, or near, the ground, on twigs, in shrubs, or low on tree trunks. This species belongs to the *Anolis altae*-species group; as other members of the group have been observed in the crowns of trees, it is possible that *Anolis carpenteri* spends considerable time out of sight of terrestrial observers, which would explain why it is not often seen.

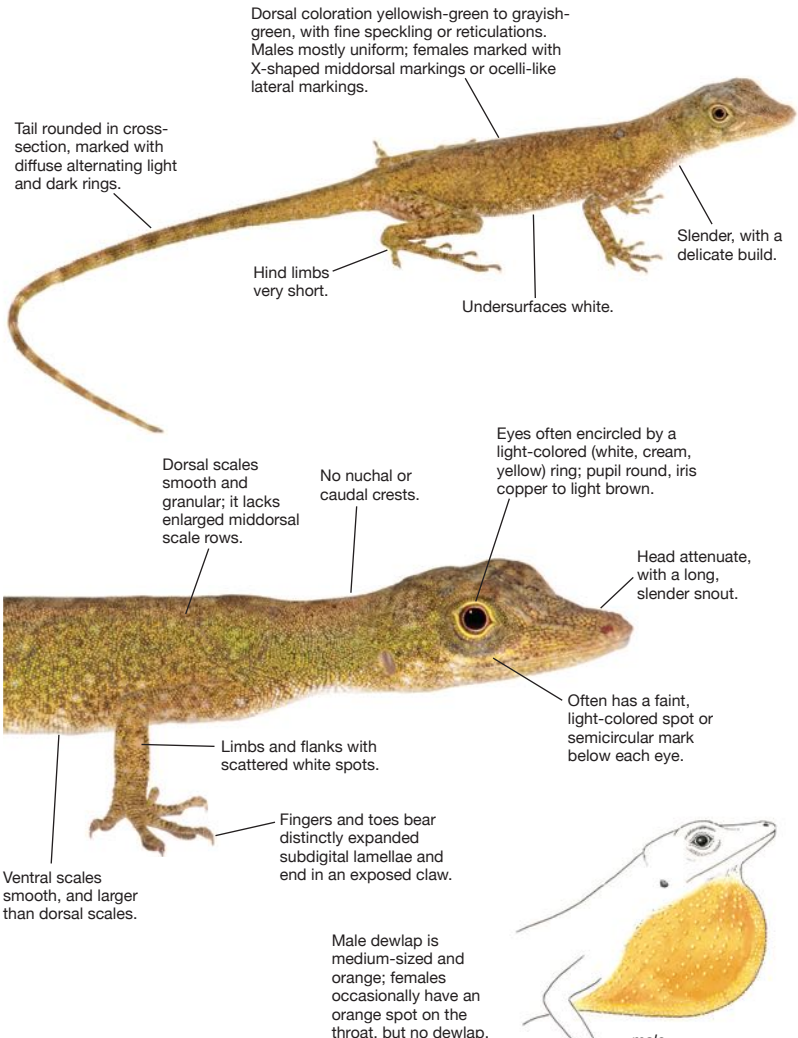
Although there are no hard numbers to confirm this, *Anolis carpenteri* is likely impacted by habitat conversion for agriculture or real estate, as well as lumber extraction. This species is generally not found in habitat edge situations and requires significant forested areas to survive.

Anolis carpenteri feeds on small insects; its juveniles are unusual in that they feed on snails.

Like other anoles, this species is oviparous and likely produces one egg at a time, at regular intervals.

Anolis carpenteri is rarely seen, in part due to its small size and camouflage. Also, it possibly ascends regularly into the treetops, where it would be more difficult to spot.

Description



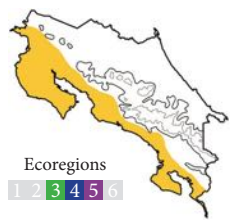
Similar species

- No other small Costa Rican anole has a similar grayish-green coloration and an orange dewlap.
- *Anolis limifrons* (p. 195) has a similar morphology, but has a tan, gray, or brown dorsal coloration, with black markings; broad alternating dark and light bands on the tail; and a small white dewlap with a basal yellow spot.

Anolis charlesmyersi
Pacific Lichen Anole

Least concern

Medium-sized and robust. Has a pointed snout, serrated crest on the tail, and an unusual lichenlike pattern of diffuse white spots on a gray to brown background. Male dewlap brick red, with relatively few white scales. Standard length to 3.1 in (78 mm); total length to 6.9 in (175 mm).



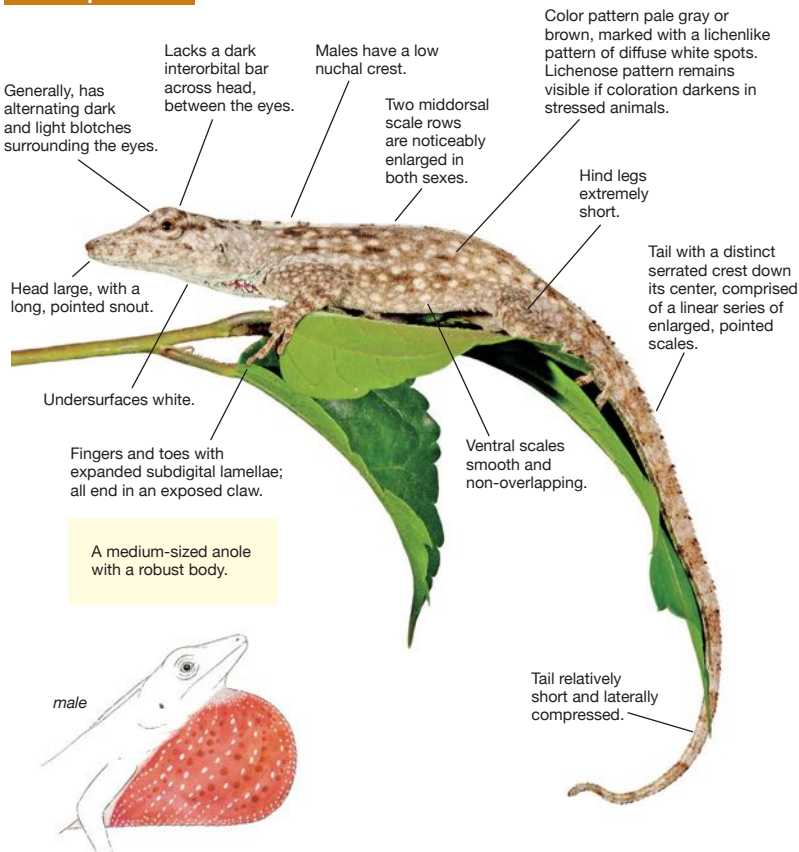
Anolis charlesmyersi is restricted to the Pacific lowlands of southern Costa Rica and adjacent western Panama; from near sea level to 1970 ft (600 m).

Natural history

Like its Atlantic slope counterpart *Anolis pentaprion*, *Anolis charlesmyersi* is a highly arboreal anole that is infrequently seen because it tends to live hidden from view in the treetops. These agile lizards bask in the early morning sun in exposed spots on the crown of a tree or other arboreal perch. Limited observations indicate some seasonality to their activity, and individuals appear to be more common during the rainy months than they are in the dry season, when this species can be difficult to detect. Other Costa Rican anole species that inhabit seasonally dry habitats tend to have their highest reproductive rates throughout the rainy season, and significantly decrease, or cease altogether, egg production during the hottest, driest months; a similar pattern could very well be expected in *Anolis charlesmyersi*.

This species seems somewhat more adaptable to habitat changes than *Anolis pentaprion*. While *Anolis pentaprion* occurs mostly in relatively undisturbed forest, *Anolis charlesmyersi* is regularly found in gardens, parks, and other open settings where some large trees persist. Since the seasonally dry forest types generally found throughout much of this species' range are often in some state of regeneration, perhaps it is better able to adapt to altered habitats. More research is needed to better understand the biology of *Anolis charlesmyersi*: it was not formally separated from *Anolis pentaprion* until 2010, so it is often unclear what information from older literature pertains to it. More recent collections attributable to *Anolis charlesmyersi* involved sleeping individuals discovered on twigs and on low vegetation, up to 10 ft (3 m) above the ground. Since these observations were made at night, little was learned about the daily activities of this species.

Description



Dewlap brick red, with few, widely spaced scales; female dewlap smaller.

Similar species

- *Anolis pentaprion* (p. 210) occurs only on the Atlantic slope; male and female dewlaps bright pink, female dewlap smaller than male's.
- *Anolis fungosus* (p. 177) is a small, rare, highland species that has a pair of bony knobs on the parietal region of the head; male dewlap red with white scales, female dewlap pale yellow.
- *Anolis salvini* (p. 216) is a rare highland species with a distinctive V-shaped interorbital dark bar across the top of the head; male dewlap red, female dewlap orange, red, or blue.

Anolis cristatellus

Puerto Rican Crested Anole

Introduced

The only anole in Costa Rica with a finlike serrated crest on its tail (most prominent in males). Of medium size, with a big head and a long snout; has a low crest on head and neck and a distinctly compressed tail. Male dewlap medium-sized, greenish yellow with an orange margin; female dewlap smaller but with similar coloration. Standard length to 3.0 in (75 mm) in males, females usually smaller.

Anolis cristatellus was introduced from its native range in the Virgin Islands and Puerto Rico in the mid-1970s. It occurs in and near the port city of Limón, Costa Rica, from near sea level to 2460 ft (750 m): its range is expanding.

Natural history

Anolis cristatellus is a non-native, invasive species in Costa Rica, where it is now commonly found throughout much of the southern Atlantic coastal plain. This highly adaptable species is tolerant of habitat alteration. It is found in city parks, in roadside vegetation, and frequently within homes and other structures. *Anolis cristatellus* may be outcompeting and replacing co-occurring lizards such as *Gonatodes albogularis*.

This species is most often seen on the ground, low on tree trunks, or on walls and rafters of wooden structures, where it ambushes invertebrate prey from its perch, rapidly dashing out to catch insects that pass by. *Anolis cristatellus* is oviparous and presumably lays eggs year-round.

Like all reptiles, *Anolis cristatellus* is dependent on receiving adequate doses of UV light from solar exposure to aid bodily functions such as the synthesizing of vitamin D. Interestingly, these lizards are also able to see into the UV spectrum, beyond the colors of visible light detectable by humans. On exposure to direct sunlight, the otherwise drab dewlap showed bright markings (much brighter than the rest of the body) when photographed with UV-sensitive film. Using the same film, researchers were also able to see a bright spot at the corner of the mouth that is only exposed when the mouth is opened, a pose characteristically assumed during aggressive encounters. Other species of anoles have similar color markings (e.g., *Anolis fungosus*) that are visible to us. Since *Anolis cristatellus* spends much of its time in areas exposed to sun, it is invariably exposed to high doses of UV radiation that increase the visibility of these markings to other members of its species. Rather than relying on bright, visible colors in its dewlap as a means of communication, *Anolis cristatellus* uses UV-reflectance, thus simultanesouly standing out to members of its own species while appearing cryptic to the rest of the world.

This species is listed as *Ctenonotus cristatellus* in older publications.

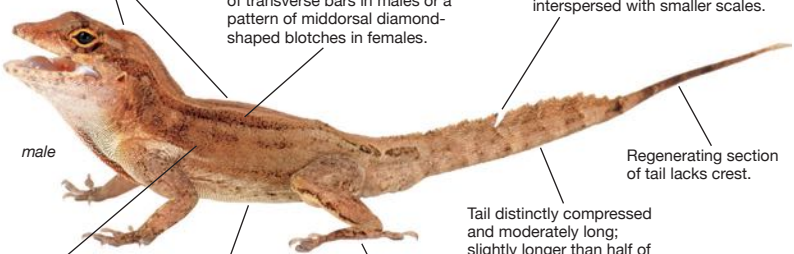
Description

Some females have a broad, middorsal pale stripe.

Males with a distinctive sail-like crest, supported by bony rays, on at least the base of the tail (often interrupted in areas of prior breakage); females with a definite but lower tail fin. Crest appears serrated because whorls of enlarged caudal scales are interspersed with smaller scales.

A low fleshy crest present on the neck and dorsum.

A relatively drab grayish-brown lizard, sometimes with a series of transverse bars in males or a pattern of middorsal diamond-shaped blotches in females.



male

Regenerating section of tail lacks crest.

Tail distinctly compressed and moderately long; slightly longer than half of the total length.

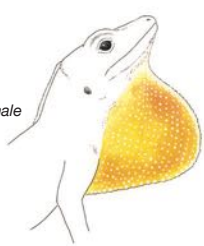
Dorsal and lateral scales granular and similar in size.

Legs long.

Ventral scales smooth and much larger than dorsal scales.

Medium-sized, with a large head and long snout.

Upper head scales smooth to lightly keeled



male

Male dewlap greenish yellow, with an orange or reddish-orange margin; female dewlap similar in coloration but considerably smaller.

Fingers and toes bear distinctly expanded subdigital lamellae and end in an exposed claw.

Venter is cream, yellowish, or greenish-gray.

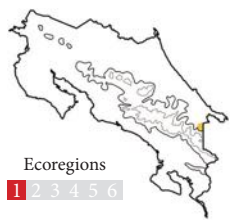
Similar species

- The presence of a low caudal crest should readily distinguish this species from other anoles.
- Only *Anolis capito* (p. 161) has a greenish dewlap, but it lives in the forest interior and has a characteristically short snout.
- *Basiliscus vittatus* (p. 142) has a caudal crest but it is a much larger lizard and has bold light-colored lateral stripes.

Anolis cryptolimifrons
Cryptic Slender Anole

Data deficient

A cryptic species closely related to, and not readily distinguishable from, *Anolis limifrons,* except by hemipenis morphology. Male dewlap small and white with a basal orange spot; female lacks dewlap. Standard length to 1.8 in (45 mm) in males, and 1.7 in (42 mm) in females.



Currently known from a small area in the Bocas del Toro region in Panama; in Costa Rica thus far only collected at Cerro Nimaso, Limón Province, but may be more widespread.

Natural history

This cryptic species was described in 2008 from Cerro Brujo, Bocas del Toro Province, Panama. It is morphologically indistinguishable from *Anolis limifrons*, except for differences in the shape and size of its hemipenes (organ small and unilobed in *Anolis limifrons*, large and bilobed in *Anolis cryptolimifrons*). As currently understood, *Anolis limifrons* occurs on all sides of the known range of *Anolis cryptolimifrons;* even though the habitat preferences of both are comparable, their distribution ranges reportedly do not overlap.

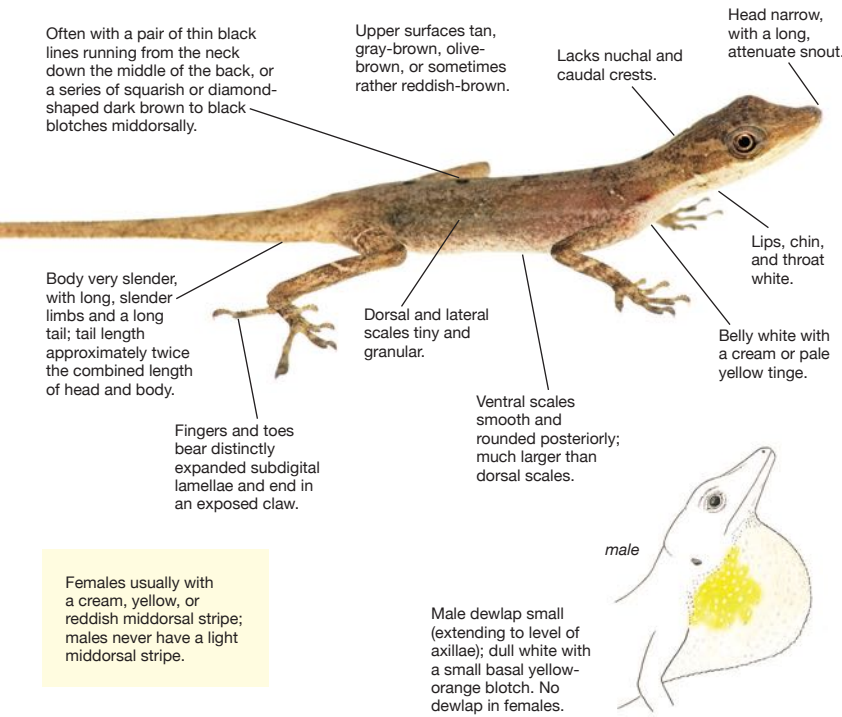
Delicate and slender, with long legs, this anole is generally active during the day on branches and leaves 1–5 ft (0.30–1.5 m) above the ground. Although it occurs in undisturbed forest, it is more common in areas of secondary, regenerating habitat. Due to the difficulty of obtaining information on this cryptic species, however, not much is known about its biology.

It is clear that, based on differences in hemipenis morphology, several different populations of *Anolis limifrons* exist. However, it has yet to be shown that the differences (significant though they are) in reproductive organs are sufficient to cause reproductive isolation. Since that is a key factor in defining biological species, some authors are skeptical about recognizing *Anolis cryptolimifrons* as a distinct species at this point.

Description

Like *Anolis limifrons*, *A. cryptolimifrons* can be recognized by its very slender morphology, distinctly banded tail, and white coloration on the lips, chin, and throat that contrasts sharply with the gray or tan dorsal surfaces.

Morphologically identical to *Anolis limifrons*; differs only in hemipenis characteristics.



Females usually with a cream, yellow, or reddish middorsal stripe; males never have a light middorsal stripe.

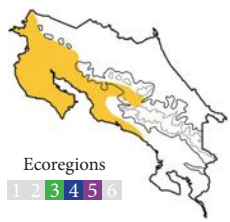
Similar species

- Differs from *Anolis limifrons* (p. 195) only in hemipenis characteristics.
- *Anolis carpenteri* (p. 163) has a similarly slender body form but has a grayish-green dorsal coloration and an orange dewlap.

Anolis cupreus
Coppery Anole

Least concern

Relatively slender and short-legged, with four distinctly enlarged, keeled middorsal scale rows; other dorsal and lateral scales uniformly small and granular. Ventral scales heavily keeled. Males with a low nuchal crest; the slightly enlarged midcaudal scales form a low caudal crest. Male dewlap very large and variable in coloration, usually white or pale yellow with an orange base and pink margin. Standard length to 2.2 in (57 mm) in males and females; total length to 6.7 in (170 mm).



Anolis cupreus occurs along the Pacific slope, from eastern Honduras to northwestern Costa Rica; near sea level to 4100 ft (1250 m).

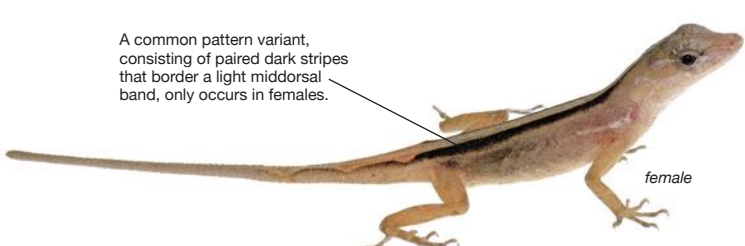
Natural history

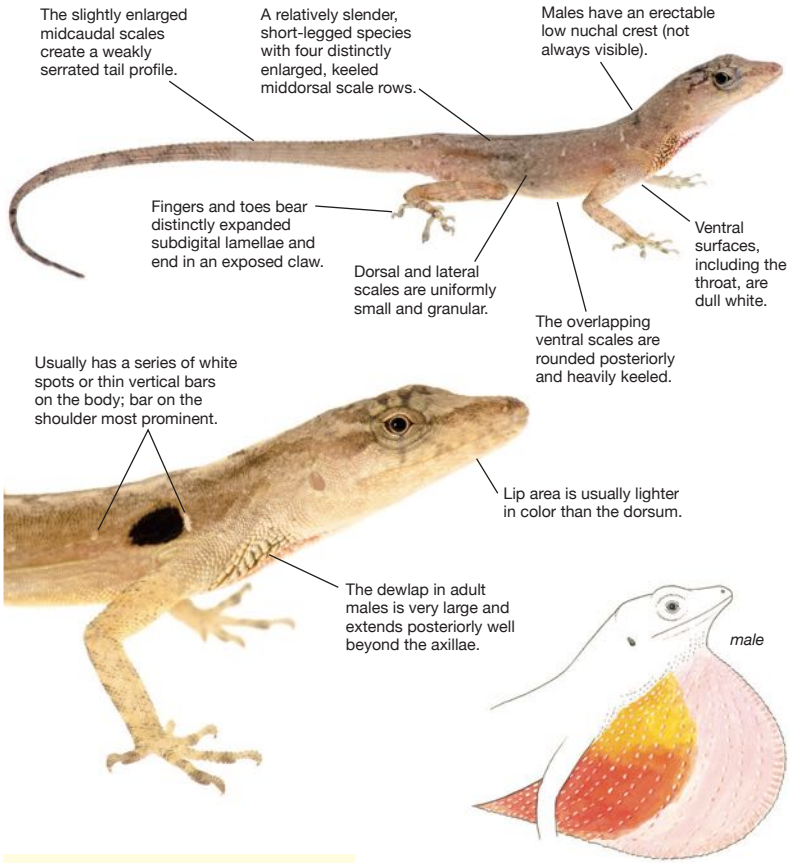
This very common and conspicuous anole is widespread in many types of dry, open areas, including riparian vegetation in forest areas, roadsides, gardens, plantations, fence rows in pastures, as well as the vegetation lining many Guanacaste beaches. *Anolis cupreus* tends to be much more common in disturbed habitats than in forests.

This species is active year-round; during the peak of the dry season, individuals are mostly found in the leaf litter or in low trees and bushes. With the onset of the rainy season, males tend to become more arboreal and take up perches as high as 30 ft (10 m) above the ground. Males increase their territorial behavior during the start of the rainy season (April through June), and breeding activity increases then. Females lay a single egg roughly every 10 days during the rainy season (approximately from late April through October), but reproductive activity ceases once the rains stop and the dry season returns. Large numbers of juveniles appear in July and August, benefitting from the increased leaf litter layer thickness and elevated insect density during the drier months. They grow and mature quickly, reaching reproductive age within one year.

Social and territorial interactions within this species are limited during the dry period. During the driest, hottest times of the year, *Anolis cupreus* tends to restrict its activity to early mornings and late afternoons, but in the remainder of the year it can be seen throughout the day. Individuals actively hunt a variety of invertebrate prey.

Description





Often uniformly dull-brown or grayish-brown, but sometimes there is a lot of pattern variation within a population. Some individuals have a broad middorsal tan or yellowish stripe, others may be marked with a longitudinal median series of chevron or diamond-shaped blotches.

Dewlap coloration quite variable; either bicolored or tricolored. Usually with a reddish-orange or yellow-orange base and a narrow or wide pink margin; in some populations the anterior border between the pink and orange color is separated by a yellow or white area. Females lack a dewlap but may have a pink and orange spot on the middle of the throat.

Similar species

- *Anolis polylepis* (p. 212) lacks the rows of enlarged middorsal scales, generally has a light lateral stripe, and has a very large orange dewlap (white with a yellow blotch in some populations).
- *Anolis limifrons* (p. 195) is exceedingly slender, with white undersurfaces and white upper lip shields; its tail is marked with broad black and tan rings, and the male dewlap is very small, white with a yellow basal spot.

Anolis datzorum
Green Mountain Anole

Data deficient

A fairly stocky, short-legged anole with an attenuate, pointed snout. Unique among highland anoles in having a mottled, bright lime-green coloration, light markings on the side of the head, and a moderate-sized, pale yellow dewlap (in both sexes). Standard length to 1.9 in (49 mm); total length to 6.7 in (170 mm).

Anolis datzorum is known from the Serranía de Tabasará and the Talamanca Mountain Range of extreme western Panama, and was recently confirmed from La Amistad International Park in the Talamanca Mountain Range of Costa Rica; 1640–7875 ft (500–2400 m).

Natural history

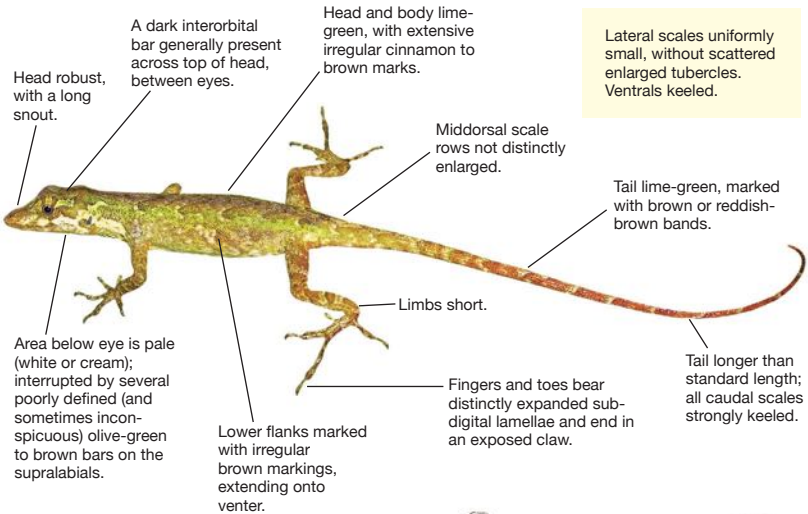
Anolis datzorum was described in 2007 based on a handful of individuals from the highlands of western Panama. In 2010, a single adult female of this species was found in Las Tablas, bordering La Amistad International Park in the southern Talamanca Mountain Range near the border with Panama, representing the first (and only) Costa Rican record of this species. More recent observations of *Anolis datzorum* indicate that it has quite a large elevational range and may be much more widespread than was previously thought. The known individuals were found mainly in edge situations in fairly undisturbed premontane rainforest. All were discovered at night, asleep on vegetation 5–12 ft (1.5–4 m) above the forest floor; some were found on small twigs, others on fern fronds or epiphytic vegetation covering a tree trunk.

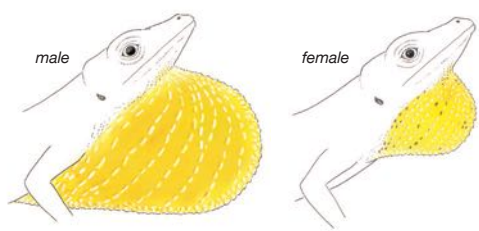
Based on the limited available data, *Anolis datzorum* seems to tolerate some habitat modification and it persists in areas with a mosaic of forest fragments and active cattle pastures. Its closest relative in Costa Rica appears to be *Anolis laeviventris*, which is a fairly adaptable arboreal anole of middle elevations.

Description

Color pattern is unique among Costa Rican anoles. Dorsum lime-green, with a diffuse, brown middorsal band in males; a series of chevron or lyre-shaped markings extends down the middle of the back. Venter dirty white.

Female pattern may include a pale-centered cinnamon middorsal stripe that extends well onto the tail, or a series of small lime-green triangles that point laterally, on either side of the vertebral stripe. Triangular spots generally outlined by brown to reddish-brown suffusion.





Dewlap moderate-sized, pale yellow with cream to pale yellow gorgetal scales in males; females have a similar but smaller dewlap. Gorgetal scales sometimes darken in response to stress.

Similar species

- *Anolis laeviventris* (p. 188) has enlarged white tubercles mixed into its flank scales; has a white dewlap.
- *Anolis kemptoni* (p. 186) is exceedingly slender and has light-colored lip shields and a pinkish-red dewlap.
- *Anolis polylepis* (p. 212) is a slender, long-legged species with a very large orange dewlap in adult males.
- *Anolis pachypus* (p. 208) is more robust, with a dark brown dorsal coloration and a distinct pattern of light lines radiating outward from each eye; male dewlap is orange-red, with a large yellow central spot.
- *Anolis benedikti* (p. 157) is more robust. It is dark brown and has a pattern of light lines radiating outward from each eye. Male dewlap is orange-red, with a broad yellow margin along the leading edge.

Anolis frenatus
Green Giant Canopy Anole

Least concern

A green anole that dwells on tree trunks and in the canopy. Long and slender; body, tail, and limbs are marked with a pattern of dark oblique crossbands that contain a series of dark oval spots with pale borders. Dewlap very large, uniform cream to white in both sexes. Standard length to 5.6 in (143 mm) in males, 4.6 in (118 mm) in females; total length to 16.9 in (430 mm).

Anolis frenatus occurs in isolated locations on the Atlantic slope, from northwestern Costa Rica to northern Colombia; near sea level to 2690 ft (820 m).

Natural history

This is a rare species that is found in the canopy and on trunks of large trees. It occurs exclusively in undisturbed lowland rainforests. *Anolis frenatus* may be more common than is generally thought, as its strictly arboreal life makes it difficult to observe.

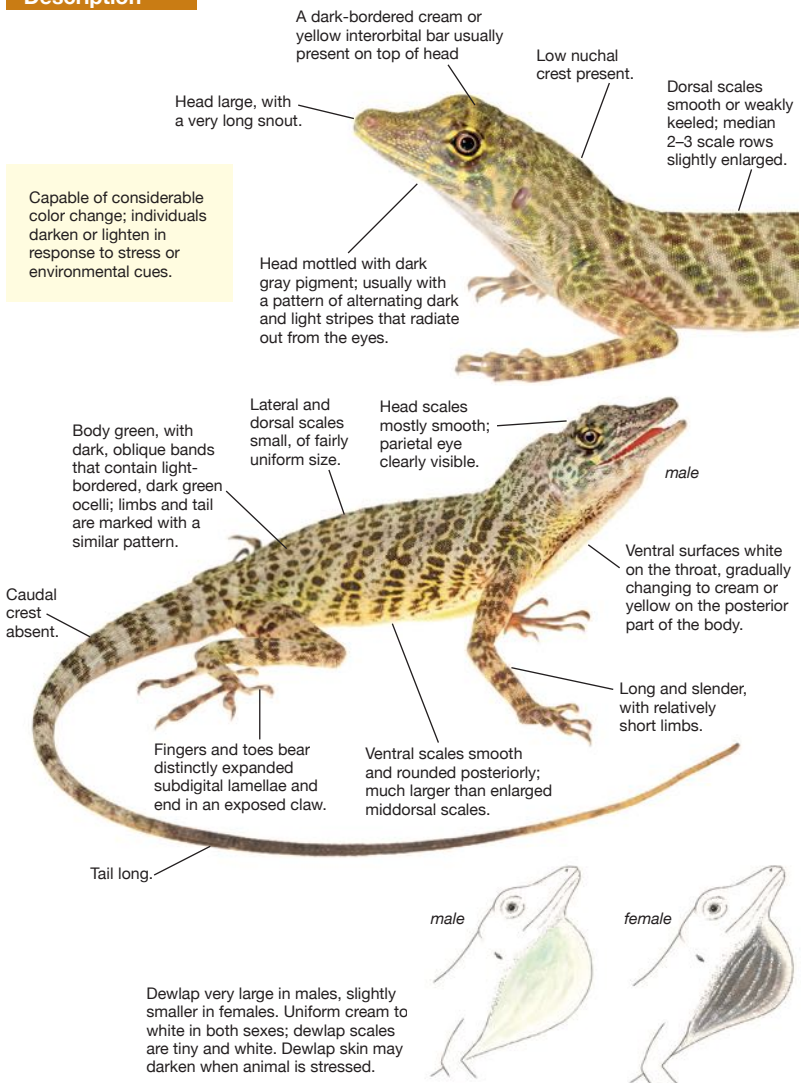
Individuals are usually spotted during the day as they perch in a head-down position on large tree trunks. Males apparently perch at a greater height above the ground (12–15 ft / 4–5 m) than do females (6–10 ft / 2–3 m). This may reflect a difference in motives: females are possibly scanning their environment for food, while males may also be on the lookout for females or intruding males. Individuals are known to descend to the ground in pursuit of prey but have also been seen climbing into the tree canopy at times. At night, both males and females can be found sleeping in a horizontal position on relatively thin twigs, at least 10 ft (3 m) above the ground. These lizards are territorial and have considerable home ranges.

Anolis frenatus feeds on large insects, mostly beetles and orthopterans, and most likely has a sit-and-wait foraging strategy. Reproduction may take place year-round, although in central Panama the highest reproductive activity was recorded during the dry season. Its eggs are laid on the forest floor in a shallow nest.

This species was previously known as *Dactyloa frenata*.

Individuals usually perch in a head-down position on the trunk of large trees.

Description



Similar species

- *Anolis biporcatus* (p. 159) lacks the characteristic oblique dark bands, comprised of oval spots, in its color pattern. Its dewlap is red, white, and blue.
- *Anolis ibanezi* (p. 182) has 2–4 dark green oblique stripes on each side of the body; male dewlap orange, female dewlap green.
- *Polychrus gutturosus* (p. 246) has an extremely long tail and its eyes are located on conical projections.

Anolis fungosus
Montane Lichen Anole

Least concern

Small, robust, and short-legged, with a unique pair of scale-covered, bony knobs in the parietal area on top of the head. Dorsal pattern dark brown with diffuse, irregular white markings arranged in a lichenlike pattern; a series of poorly defined white rings marks the tail. Male dewlap medium-sized, red with white scales; female dewlap small and pale yellow. Standard length to 1.8 in (47 mm); total length to 4.1 in (103 mm.

Anolis fungosus is known from few scattered localities in the Talamanca Mountain Range, mainly near the northern end of that range in Costa Rica and at its southern end in western Panama; from 3935–5250 ft (1200–1600 m). It likely also occurs in intermediate sections of the Talamanca Mountain Range.

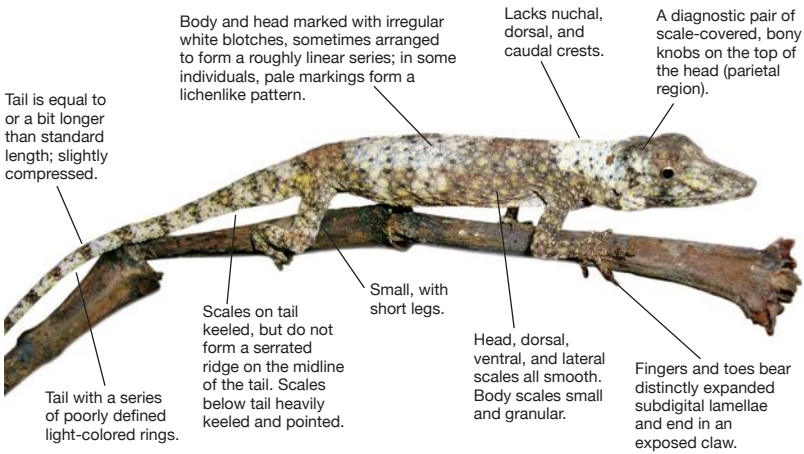
Natural history

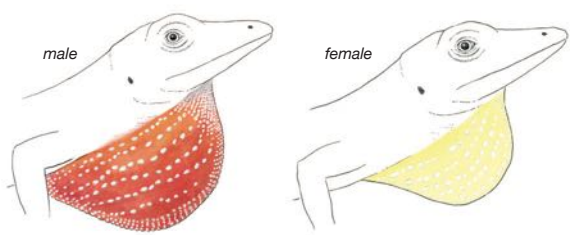
This is a rare anole, known from very few individuals. It is an arboreal species that prefers forest interiors at intermediate elevations. Costa Rican examples of this species have been found near Tapantí, in southern Cartago Province, and near Chirripó Grande; individuals have also been discovered in the La Fortuna region of western Panama and on Cerro Pando near the border with Costa Rica, indicating that *Anolis fungosus* may be more widespread in the Talamanca Mountain Range than is currently thought.

Discovered and described in 1971, this species was initially known from just four adult males and one juvenile; it was not until 2012 that the first female was found. Two adult females were found on the same night, asleep on vegetation. One was found on a leaf overhanging a small stream, while the other was found sleeping in a shrub at a height of about 8 ft (2.5 m) above the ground. Since most individual *Anolis fungosus* were collected at night, little is known about their normal daytime behavior.

Female *Anolis fungosus*, like those of other members of the *Anolis pentaprion*-group, are unusual in having a functional dewlap. In this species, the female dewlap is pale yellow and distinctly different in color than the red dewlap found in males. It is unclear whether females utilize their dewlap for intraspecific communication, and more research is needed to explore the evolutionary advantage of this feature. Females of the related species *Anolis salvini* also have a dewlap that is noticeably different in coloration from the male dewlap. Both *Anolis fungosus* and *Anolis salvini* have a striking black lining of the mouth and throat, in both sexes.

Description





Male dewlap medium-sized, red with white scales; female dewlap small and pale yellow.

Similar species

- *Anolis salvini* (p. 216) lacks bony knobs on the top of the head and has a slightly V-shaped interorbital bar across the top of its head; male dewlap red, female dewlap orange to blue.
- *Anolis charlesmyersi* (p. 165) occurs at lower elevations on the Pacific slope; it is a larger species with a brick red dewlap.
- *Anolis pentaprion* (p. 210) is larger and has a bright pink dewlap; it generally occurs at lower elevations.
- *Anolis altae* (p. 153) lacks a lichenlike pattern; males have an orange dewlap.
- *Anolis laeviventris* (p. 188) has enlarged white tubercles mixed into the small, granular flank scales, and has a white dewlap.

Anolis humilis
Ground Anole

Least concern

A small, brown terrestrial anole. Has a broad band of 8–10 distinctly enlarged middorsal scales. Typically has a deep axillary pocket in the "arm pit" of each front limb. Male dewlap moderate-sized, reddish-orange with a yellow margin; no dewlap in females. Standard length to 1.8 in (46 mm) in males, 2.0 in (50 mm) in females.

Anolis humilis occurs on the Atlantic slope, from extreme eastern Honduras to eastern Panama; generally found at low elevations (near sea level) but reaches 6235 ft (1900 m).

Natural history

This is a predominantly terrestrial species of the leaf litter. It is found in deeply shaded sections of primary rainforest, plantations, and other forested habitats. Adult males will frequently ascend low perches up to 2 ft (0.6 m) above the ground, whereas females and juveniles tend to remain on the ground. *Anolis humilis* is often associated with buttresses of large trees, where it inhabits the leaf litter that collects between the roots. This species is a thermoconformer and does not bask; *Anolis humilis* is able to function at a body temperature equal to that of the surrounding air, which can be as low as 61 °F (16 °C).

This is a strictly insectivorous species; examination of its stomach contents revealed that spiders, isopods, caterpillars, beetle larvae, cicadas, and crickets make up the bulk of its varied diet. The stomachs of several individuals also contained soil and plant matter that were probably ingested along with prey.

The smallest sexually mature male of this species measured 1 in (26 mm). Females become sexually active when they reach 1.3 in (32 mm). Both sexes reach maturity approximately 6 months after hatching. Reproduction and egg-laying occur year-round, although the number of hatchlings that emerge during the dry season is lower than at other times of the year. It is not known whether this is caused by a decrease in the number of eggs produced in the dry season, or if the dry climate hinders egg development or lowers the hatching success rate. Hatchlings are tiny, with a standard length of 0.7 in (17 mm).

When active, *Anolis humilis* spends its time foraging. Generally, these lizards scan their surroundings from an elevated foraging perch and run short distances to grab invertebrates that come within reach. Juveniles, less experienced at catching prey, may forage the entire day.

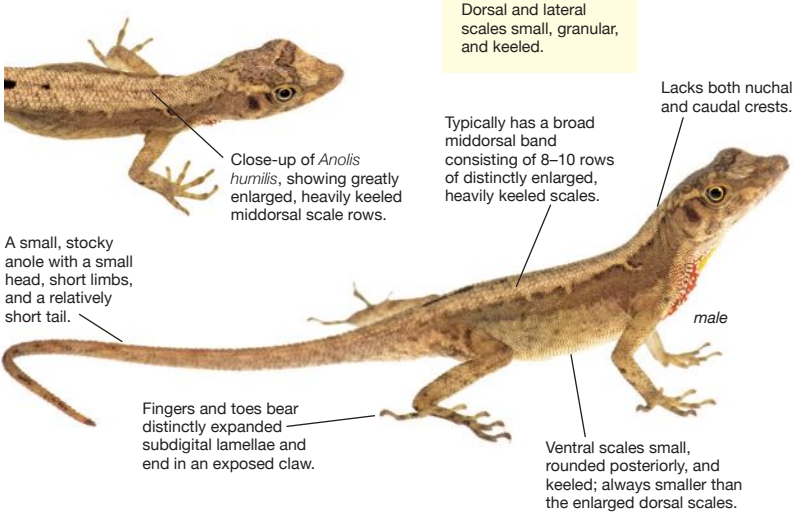
Males devote a substantial amount of their time to social interactions, more so than females. They typically start their day by displaying their brightly colored dewlap and bobbing their head, signals used to communicate with other individuals of the species. A male spends several hours advertising his presence in his territory, usually without receiving a response from other individuals. If a female enters a male's territory during this advertisement period, the male will engage in courtship displays. Both males and females of this species have a distinct home range that includes suitable sites for egg-laying, sleeping, and foraging, as well as ideal escape routes, and adults rarely venture outside of this area. Social interactions mostly take place between neighbors with an overlapping home range, or with wandering subadults that are still looking to establish a territory.

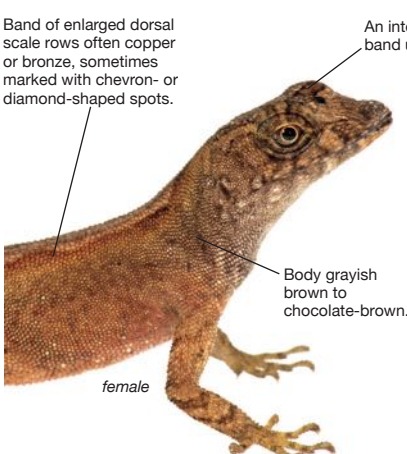
In 2003, a wide-ranging cryptic form, *Anolis quaggulus,* was elevated to full species status and removed from *Anolis humilis*, based on differences in hemipenes morphology. *Anolis quaggulus* is indistinguishable from *Anolis humilis* on external morphology alone; to complicate matters even more, the distribution ranges for both forms overlap in the central Atlantic lowlands of Costa Rica. In 2015, a study on molecular differences

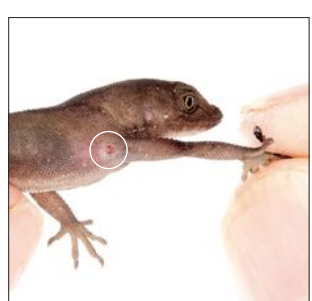
between members of the *humilis*/*quaggulus*-complex revealed that not just two, but up to six, unique genetic forms are hidden in this complex. Thus, recognizing only *Anolis quaggulus* does not accurately reflect the complexity of the cryptic forms contained within the larger species complex, and it is preferable to treat them here as a single taxonomic unit, *Anolis humilis*.

The 2015 study also showed that the time at which each cryptic form diverged correlates with geographic patterns, with the southernmost forms being the oldest, and the northernmost ones the more recent. This indicates that dispersal of the various cryptic forms in the *Anolis humilis*-complex took place in a south to north direction, starting in eastern Panama and eventually reaching eastern Honduras; an isolated population (now considered a separate species, *Anolis marsupialis*) even reached the Pacific coast. More research is needed to further clarify the distribution ranges and diagnostic features of the various members of the *Anolis humilis*-complex.

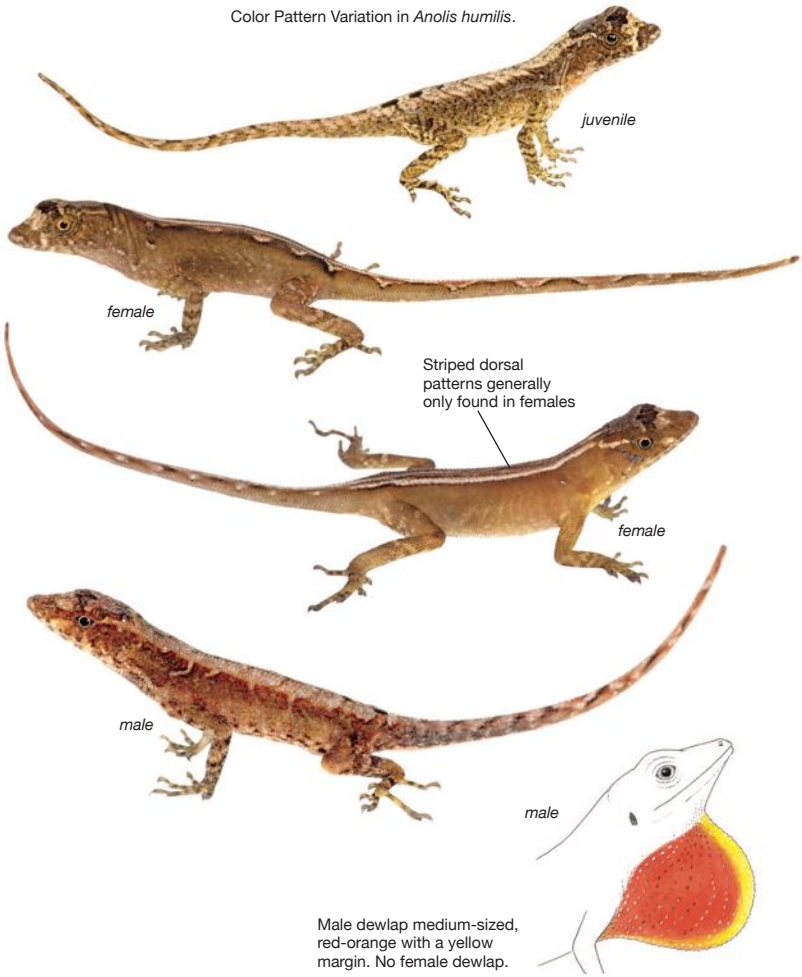
Description







A deep, tube-like axillary pit (often filled with mites) is present in each armpit.



Similar species

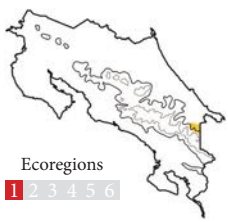
- *Anolis marsupialis* (p. 198) is geographically isolated; males have an erectable nuchal crest and a red dewlap that lacks a yellow margin but is marked with maroon semicircles.
- *Anolis sagrei* (p. 214) is an invasive species with a yellow-margined red dewlap; it has an erectable nuchal and dorsal crest in males, and a distinctly compressed tail that is topped with a serrated scaly ridge. It lacks a middorsal row of greatly enlarged scales.
- *Anolis benedikti* (p. 157) has a red dewlap with a partial yellow margin but lacks a middorsal row of greatly enlarged scales.
- Juvenile *Anolis capito* (p. 161) tend to be brown and similar in size but lack a band of greatly enlarged middorsal scales.

Anolis ibanezi

Ibanez' Giant Canopy Anole

Least concern

The only large, bright green anole in Costa Rica with a pattern of diagonal dark stripes on its flanks. Male dewlap is large and orange, with oblique, pale green streaks; female dewlap large and green, with a yellowish base. Standard length to 3.1 in (79 mm) in males, and 2.9 in (73 mm) in females; total length to 10.8 in (275 mm).



Anolis ibanezi is known from the Atlantic foothills of western Panama, west of the Panama Canal, and reaches extreme southeastern Costa Rica; 1310–2950 ft (400–900 m).

Natural history

This rare species is only known from a few individuals found in western Panama and adjacent southeastern Costa Rica. *Anolis ibanezi* inhabits tree crowns and the upper reaches of large tree trunks in undisturbed, lowland rainforests, making it difficult to observe. Most of the known individuals were found at night, asleep on leaves and twigs 7–15 feet (2–5 m) above the ground.

Anolis ibanezi is oviparous; a single egg of this species was found under loose bark.

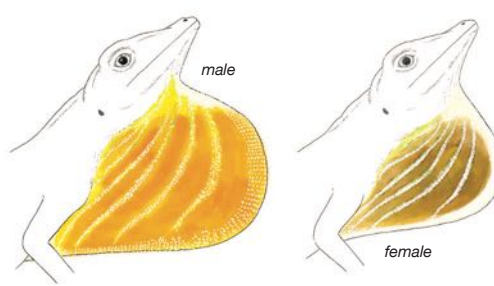
This species reportedly vocalizes, and can emit an audible squeak when handled.

Anolis ibanezi was previously included in *Anolis (Dactyloa) chocorum*, which was once thought to be wide-ranging but is now restricted to parts of central and eastern Panama, as well as adjacent Colombia. Costa Rican records of *Anolis ibanezi* are therefore referred to as *Dactyloa chocorum* or *Anolis chocorum* in some older publications.

In Costa Rica, *Anolis ibanezi* is only known from a few individuals. This well-camouflaged canopy species has a limited distribution in the country, making it difficult to observe.

Description

Dorsal and lateral scales granular. Ventral scales large and smooth.



Male dewlap very large; orange with oblique yellowish-green streaks, a white anterior margin, and green base. Female dewlap large; dull brown with a yellowish-green base.

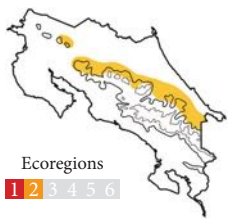
Similar species

- *Anolis biporcatus* (p. 159) is more robust with short limbs and a shorter snout; it lacks dark green diagonal stripes on its flanks and its dewlap is red, white, and blue.
- *Anolis frenatus* (p. 175) has oblique dark bands on its body but they are comprised of several rows of dark, oval spots; its dewlap is white.
- *Polychrus gutturosus* (p. 246) has an extremely long tail and its eyes are located on conical projections.

Anolis insignis
Jeweled Giant Canopy Anole

Least concern

A very large anole that dwells on tree trunks and in the canopy. Has a large, pale-centered dark shoulder spot on each side of the neck and several dark green or dark gray oblique stripes on its flanks that each contain a series of light-centered spots. Standard length to 6.3 in (160 mm) in males, 5.3 in (135 mm) in females; total length to 18.3 in (464 mm).



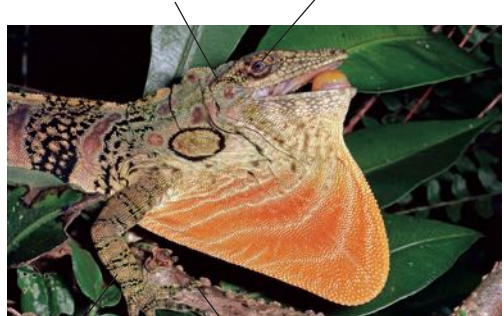
Anolis insignis is widespread in lowlands and foothills on the Atlantic slopes of the Guanacaste, Tilarán, Central, and Talamanca mountain ranges of Costa Rica, and ranges into western Panama; 1395–5250 ft (425–1600 m).

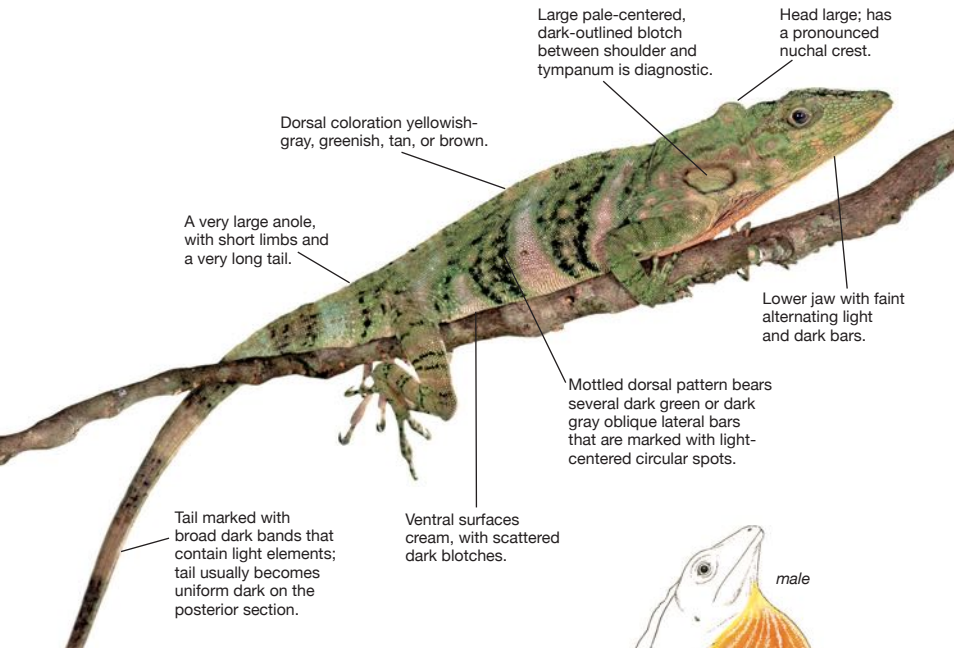
Natural history

Anolis insignis is a wide-ranging but infrequently observed canopy species known from just a few sightings. It is found in undisturbed premontane forests, usually in the forest interior. These very large anoles tend to inhabit the upper regions of tree trunks and tree crowns, making them very difficult to observe. Historically, the earliest specimens of this lizard, and related canopy species, were collected by biologists who followed logging crews and simply searched the crowns of recently felled trees. More recently, individuals have been spotted at night as they sleep exposed on branches at a considerable height. As a result, hardly any information is available on their natural history or even on their daytime activity. Most likely, these are sit-and-wait predators that prey on relatively large invertebrates. Given their large size, they may occasionally include small vertebrates in their diet.

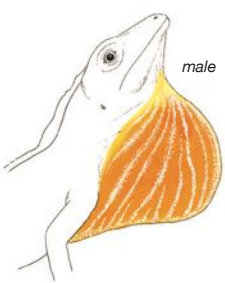
This species is sometimes listed as *Dactyloa insignis* in publications.

Description





Capable of considerable color change; head and body may temporarily develop a pattern of pale cream and orange blotches when excited.



Males have a very large orange to red dewlap, usually with a pattern of greenish-white or cream stripes and a similarly colored margin; females have a greenish-brown dewlap.

Similar species

- *Anolis microtus* (p. 200) has a dark-outlined light stripe that extends from behind the eye to the insertion of the front limb; male dewlap pale salmon, with white scales.
- *Anolis savagei* (p. 218) has a prominent dark postorbital blotch on each side of the head (not a pale-centered shoulder spot); male dewlap pale pink, with dark streaks.

Anolis kemptoni
Cerro Pando Highland Anole

Least concern

Closely related to *Anolis altae*: females morphologically indistinguishable; males differ in hemipenis morphology and dewlap color. Nondescript, with a relatively slender body and head, and very short limbs. Fairly uniform gray, tan, or reddish-brown, with a white upper lip area. Male dewlap large, tinged pink, with orange along the anterior margin, white scales; females have a small white dewlap. Standard length to 2.1 in (53 mm) in males, and 2.4 in (60 mm) in adult females; total length to 6.3 in (161 mm).

Anolis kemptoni is only known from the Talamanca Mountain Range in extreme southern Costa Rica and adjacent western Panama; 4430–6400 ft (1350–1950 m).

Natural history

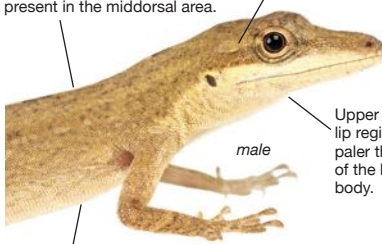
This is a species with a very limited distribution in Costa Rica, only occurring in the Talamanca Mountain Range, near the border with Panama. It was previously described as *Anolis* (*Norops*) *pandoensis*, named after the type locality, Cerro Pando, which straddles the border. In 2006, comparison of that taxon with a previously described species from nearby Panama, *Anolis kemptoni*, showed that both represented individuals of the same species. Since *Anolis kemptoni* had been formally described before *Anolis pandoensis*, the earlier name took precedence.

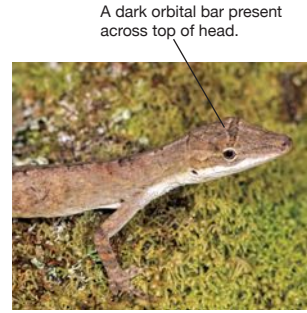
Anolis kemptoni is closely related to the more widespread *Anolis altae,* and other allied highland endemics (e.g., *Anolis monteverde*, *Anolis tenorioensis*), which also have a very restricted distribution range. It differs from these species primarily in male hemipenis morphology and, more noticeably, male dewlap coloration; females of these species are difficult to distinguish from one another based on external morphology. Although it is likely that *Anolis kemptoni* shares a similar biology with its closest relatives, none of these have been studied in depth and there is little information about their natural history.

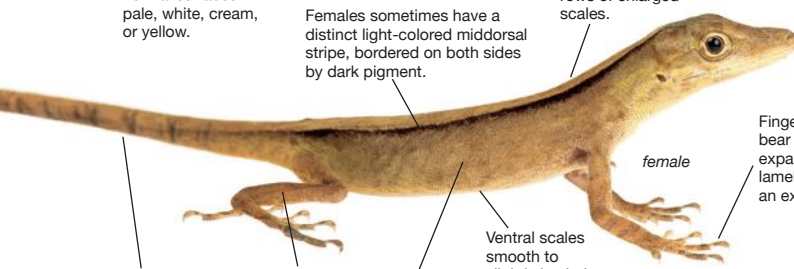
In the Las Tablas region of Costa Rica, *Anolis kemptoni* is fairly common in modified habitats. This ground and shrub species is most often seen within the forest. During the day, individuals perch on twigs, low in shrubby vegetation, or on the base of larger tree trunks. They descend to the ground when looking for prey in the leaf litter but escape into bushy tangles when startled. Individuals displayed a higher density in edge situations, where increased solar exposure causes scrub vegetation to be denser than it is within the forest interior, leading to better access to more perches, hiding places, and basking spots. At night, individuals are found sleeping exposed on twigs, usually within 7 ft (~2 m) of the ground; if weather conditions are unsuitable (rain, strong winds, or bright moon light), however, these lizards choose less exposed locations to spend the night. It is not known where they go on such nights, but their apparent absence from exposed vegetation suggests that they may hide in the leaf litter or under cover objects.

Anolis kemptoni is insectivorous and actively hunts for invertebrate prey during the day. Like other anoles, it reproduces by laying eggs, and females will lay a single egg every few weeks. Although details are not known, reproduction likely takes place throughout much of the year.

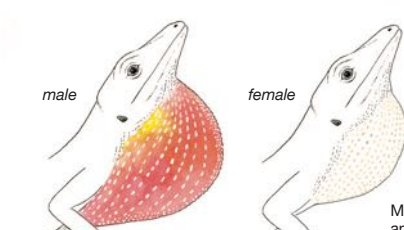
Description







Dorsal markings minimal; generally there is a middorsal series of dark blotches or X-shaped or butterfly-shaped markings; capable of changing color to dark olive-green or brown in response to stress or environmental cues.



Male dewlap large; pink with an orange anterior margin and white scales. Female dewlap small and white.

Similar species

- *Anolis altae* (p. 153) is geographically isolated; males have an orange dewlap.
- *Anolis polylepis* (p. 212) is a slender, long-legged species with a very large orange dewlap in adult males.
- *Anolis pachypus* (p. 208) is more robust, with a dark brown dorsal coloration and a distinct pattern of light lines radiating outward from each eye; male dewlap is orange-red, with a large yellow central spot.
- *Anolis benedikti* (p. 157) is more robust. It is dark brown and also has a pattern of light lines radiating outward from each eye; male dewlap is orange-red, with a broad yellow margin along the leading edge.

Anolis laeviventris
Pale Mountain Anole

Least concern

A small to medium-sized, plain looking montane anole. Characterized by heterogeneous scales on its body; the small, granular scales on the flanks have scattered enlarged scales mixed in. Adult males have low nuchal and caudal crests. Male dewlap white, with white scales; absent in females. Standard length to 2.1 in (54 mm) in both sexes; total length to 5.7 in (145 mm).

Anolis laeviventris occurs in disjunct populations throughout the mountainous regions of Central America, from northwestern Guatemala to western Panama; 3800–6560 ft (1160–2000 m).

Natural history

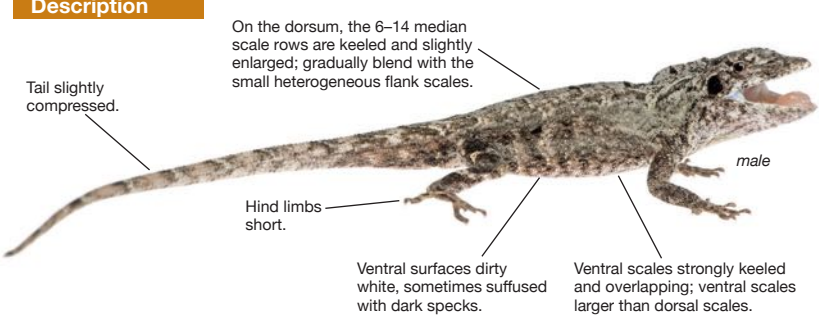
Anolis laeviventris is common and widespread in foothills and mountains throughout its range. It is often seen in the immediate vicinity of humans, even in severely altered habitats. This species commonly occurs in coffee plantations, ornamental gardens, and parks in many middle elevation towns and cities.

It is a predominantly arboreal species, mostly seen on tree trunks (usually less than 10 ft [3 m] above the ground), or perched in dense leafy tangles of thick scrub. Individuals usually perch in exposed, sunny spots, but may retreat to the interior of bushes once an optimum body temperature is attained.

Reproduction is seasonal, and egg-laying takes place throughout the rainy season (May–November); females produce a clutch consisting of a single egg every 2 to 3 weeks. This species has a high population turnover rate. Sexual maturity is reached about four months after hatching, and only few individuals survive through their second breeding season.

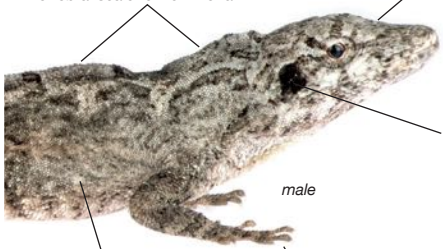
The taxonomic status of this species is yet to be definitively established. As currently understood, the species *Anolis laeviventris* is widespread, existing in disjunct highland populations spread over several mountain ranges throughout Central America. However, some authors consider it a complex of several different species, designating populations in eastern Mexico and western Guatemala as *Anolis laeviventris*, populations from western Guatemala to eastern Honduras as *Anolis nannodes*, and those from northern Nicaragua to western Panama as *Anolis intermedius*. The latter name is therefore applied to Costa Rican populations in some literature.

Description



Males have a nuchal crest and a low caudal crest formed by an enlarged vertebral scale row on the tail.

Doral coloration somewhat plain (gray, cream, or tan), sometimes with a few irregular darker markings, or dark mottling in the middorsal area.



male

Capable of considerable color change. Like the animal pictured, excited or stressed individuals can temporarily develop dark markings, or even appear almost completely black.

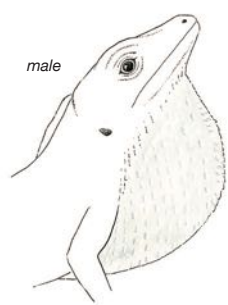
Fingers and toes with distinctly expanded subdigital lamellae; all end in an exposed claw.

Lateral scales typically granular, with few distinctly enlarged scales mixed in. Enlarged flank scales usually white, contrasting with the surrounding smaller scales.

A small to medium-sized, moderately robust species.

female

Coloration generally fairly uniform gray, tan, or brown. Sometimes with darker mottling or a row of indistinct dark chevrons along the midline. Females occasionally have a cream or orange-tan middorsal stripe.



male

Male dewlap moderate in size, with white dewlap scales. Females lack a dewlap.

Similar species

- *Anolis altae* (p. 153) is another relatively nondescript highland anole, but its flank scales are uniformly small and granular without enlarged white tubercles mixed in; its dewlap is orange.
- Female *Anolis lemurinus* (p. 192) have a small white dewlap (males have a red dewlap with black and white scales); this species lacks heterogeneous flank scales.

Anolis leditzigorum

Leditzig's Cloudforest Anole

Data deficient

A stocky, medium-sized anole in the *Anolis pachypus*-complex; nearly indistinguishable from related species by morphology alone. As a group, recognized by the dark bar across the head between the eyes, and a light stripe emanating from behind the eye, past the corner of the mouth and onto the neck. Male *Anolis leditzigorum* dewlap is medium-sized, purplish red with white scales; female dewlap small and white. Standard length to 1.9 in (49 mm) in both sexes; total length to 6.1 in (155 mm).

A Costa Rican endemic. Found only at middle elevations on Rincón de la Vieja Volcano, in the Tilarán Mountain Range, and in western sections of the Central Mountain Range; 4511–6300 ft (1375–1920 m).

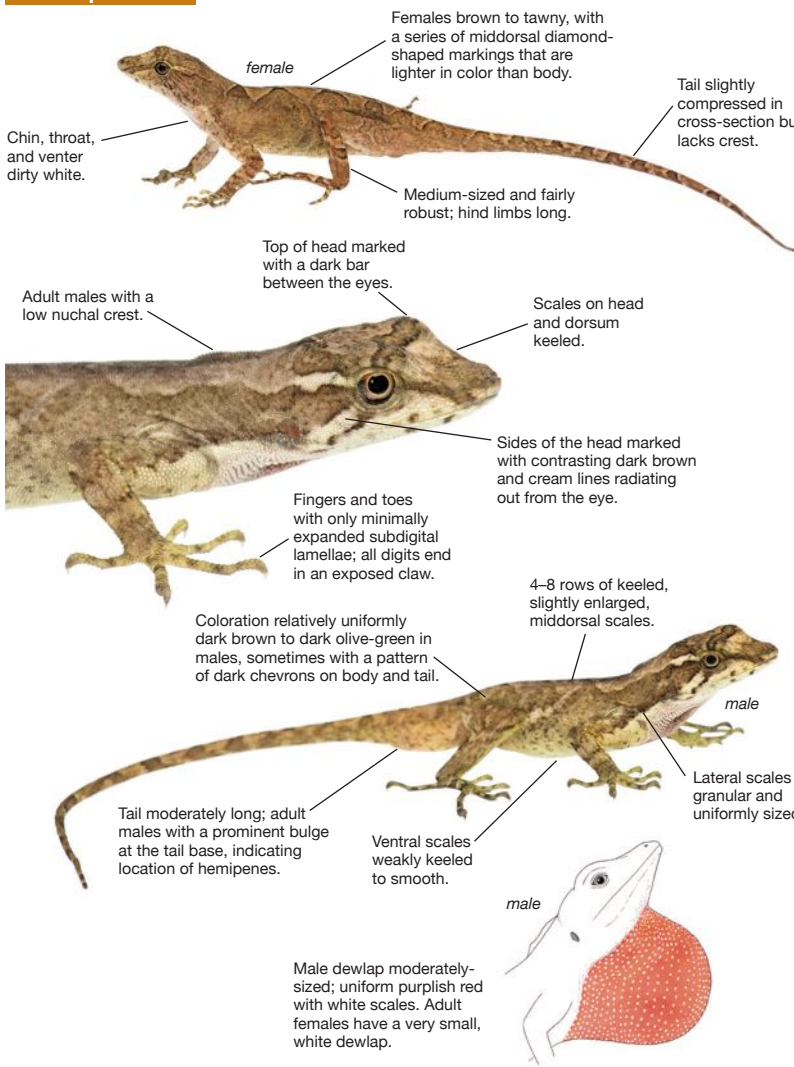
Natural history

Anolis leditzigorum is a cryptic species in the *Anolis pachypus*-complex. It is practically indistinguishable from the closely related species *Anolis alocomyos* and *Anolis tropidolepis* based on external morphology alone, but differs from those two species in molecular traits, as well as in hemipenis morphology. These three species differ from the two remaining Costa Rican species in the *Anolis pachypus*-complex (*Anolis benedikti* and *Anolis pachypus*) in having a solid red to purplish-red dewlap with white scales.

This species was described in 2014. Although it is difficult to identify in the field, clues come from a combination of external morphology and geographical provenance. Within its range, it is commonly seen; *Anolis leditzigorum* prefers edge situations and fairly open habitats. It is relatively tolerant of habitat alteration and is regularly seen in the immediate vicinity of humans, along roads, or even in isolated trees left standing in otherwise cleared pasture land. Individuals can be observed basking in sun-exposed areas from early to mid-morning; preferred perch sites are often slightly elevated above the ground (twigs in low shrubs, low on tree trunks or logs, or even on buildings). Individuals are also regularly seen on the ground, sometimes hidden in clumps of herbaceous vegetation. During cold, rainy, or windy weather conditions, *Anolis leditzigorum* tends to remain hidden under cover objects, or in burrows. At night, it can be found sleeping exposed on the upper surfaces of leaves and twigs in low vegetation; it often prefers vegetation along road cuts or stream courses.

The various highland populations that comprise the *Anolis pachypus*-complex are now isolated in different mountain ranges throughout the country. But these populations were likely connected during relatively recent glacial periods, when temperatures were cooler in the intervening valleys. Gene flow between these cryptic species was still possible as recently as 15,000 years ago, which could explain why they have not yet evolved to become more morphologically distinct.

Description



Similar species

- *Anolis tropidolepis* (p. 224) may occur near *Anolis leditzigorum*; the male dewlap of *Anolis leditzigorum* is purplish-red, whereas that of *Anolis tropidolepis* is orange-red.
- *Anolis humilis* (p. 179) is dark brown overall, but has a characteristic broad band of enlarged middorsal scales; its dewlap is red with a yellow margin.
- *Anolis capito* (p. 161) has a distinctively short snout and a small greenish dewlap.
- *Anolis woodi* (p. 228) is arboreal, has blue eyes, and a dark green to brown dewlap.

Anolis lemurinus
Canopy Anole

Least concern

A medium-sized anole with a fairly robust body, short snout, and short limbs. Has a highly variable color pattern. Top of head typically has a flat shelf, extending posteriorly to the eyes. Flank scales uniformly granular, without enlarged, white tubercles mixed in. Male dewlap small and red, with white and black scales; female dewlap small and white, with white and black scales. Standard length to 3.1 in (79 mm) in both sexes; total length to 9.0 in (228 mm).

Anolis lemurinus is widespread along the Atlantic slope of Central America, ranging from Veracruz, Mexico, to western Panama. On the Pacific slope, it occurs in southwestern Costa Rica and western Panama; from near sea level to 3610 ft (1100 m).

Natural history

This is a relatively uncommon anole of lowland and premontane rainforests. Although it is most often observed on low vegetation along forest clearings, trails, or other edge situations, this is a highly arboreal species that spends a lot of time out of sight in the rainforest canopy. Individuals appear to seek out basking perches and may return to the same perch daily for prolonged periods of time; preferred perches are generally on the outside of bushes, or on the ends of branches in the canopy, but may also include man-made structures in forested settings that provide the right level of exposure. *Anolis lemurinus* tends to occur in low density, and individuals usually appear singly.

Unlike anoles that occur in higher density, *Anolis lemurinus* is not known to engage in male-male territorial contests that involve displays of the dewlap or other behavioral signals. Interestingly, females of this species have a small, functional white dewlap that is colored differently from the male's red dewlap. Sexual dimorphism in dewlap coloration is seen in a few other arboreal anoles in the country (e.g., *Anolis fungosus* and *Anolis salvini*), and perhaps serves a role in establishing or maintaining a pair bond in an arboreal environment where visibility is hampered by dense vegetation.

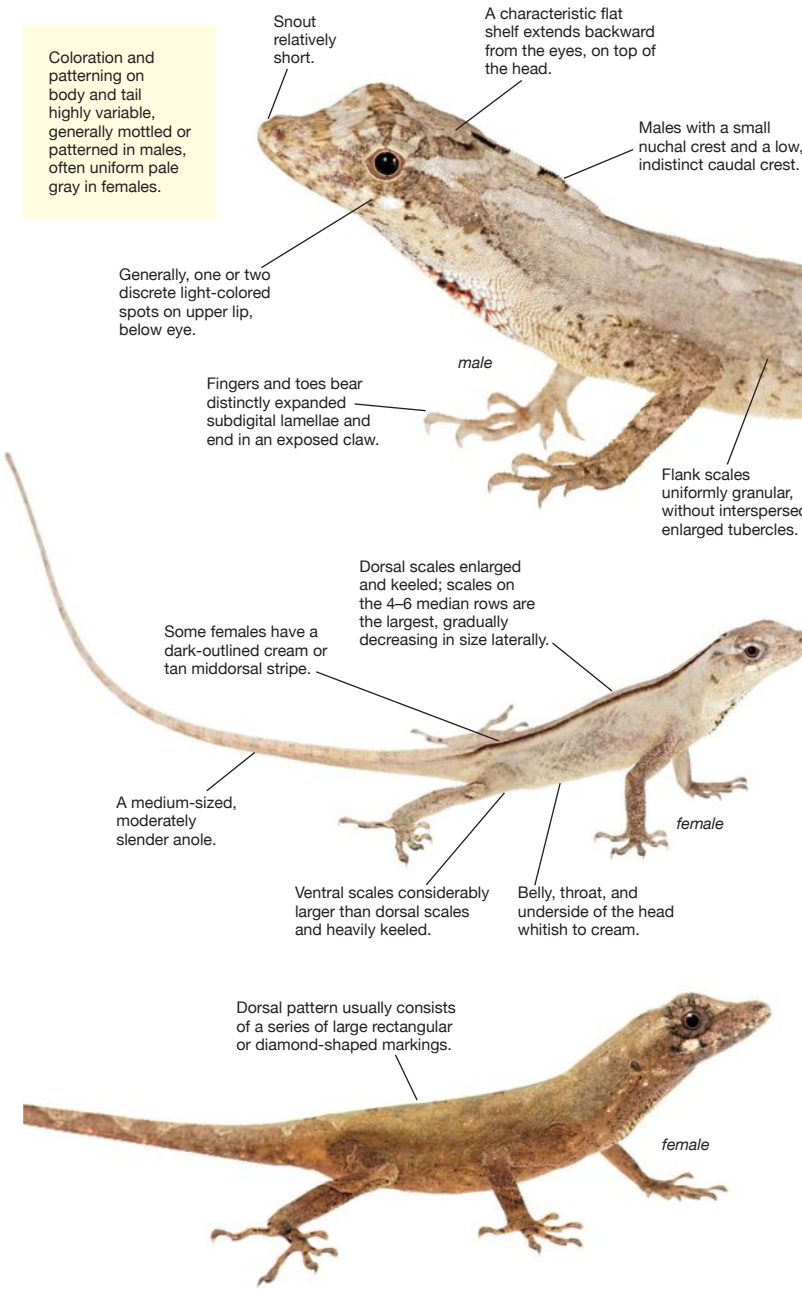
The size of the female dewlap in *Anolis lemurinus* sometimes causes observers to believe that the animal in question is male instead. The white dewlap, combined with a highly variable color pattern that defies easy description, can easily lead observers astray when trying to identify one of these lizards.

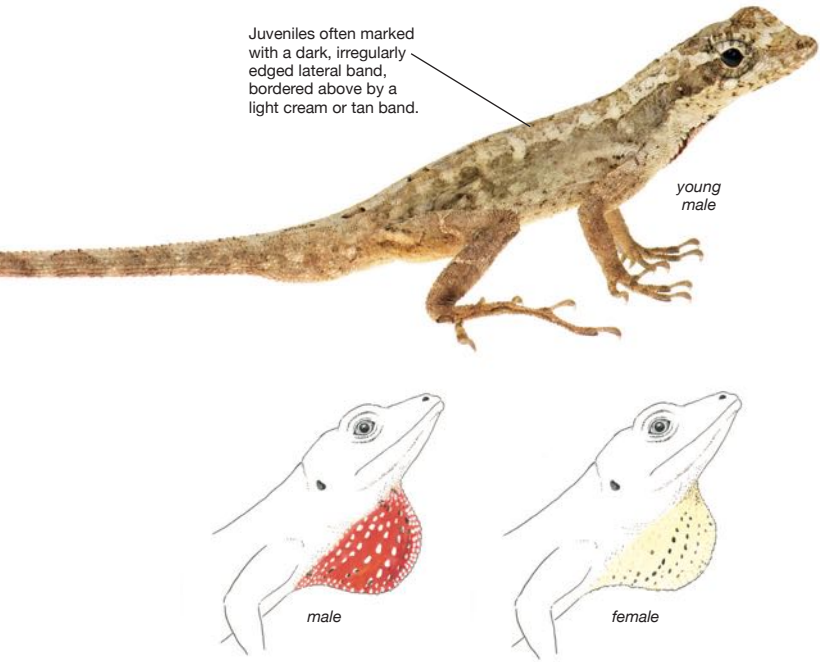
Reportedly, *Anolis lemurinus* breeds year-round, but reproductive activity increases during the rainy season (approximately late April through December). Like other anoles, this species is oviparous; it is not known whether eggs are deposited in arboreal or terrestrial sites.

Anolis lemurinus can be difficult to identify, but the black and white scales on the male's red dewlap are a good field mark.

Description

Coloration and patterning on body and tail highly variable, generally mottled or patterned in males, often uniform pale gray in females.





Male dewlap small; dark red with white and black scales. Female dewlap slightly smaller and white, also with white and black scales.

Similar species

- Male *Anolis laeviventris* (p. 188) have a white dewlap, but these lizards typically have enlarged white tubercles mixed in with the small granular scales on their flanks.
- *Anolis humilis* (p. 179) has a broad middorsal band of greatly enlarged scales; its males have a reddish-orange dewlap with a yellow margin.
- *Anolis capito* (p. 161) has a distinctively short snout and a mottled, camouflaged color pattern; male dewlap is small and yellowish-green.
- *Anolis limifrons* (p. 195) is exceedingly slender, with white undersurfaces and a tan dorsum, marked with dark middorsal lines or blotches and broad black bands around its tail; it has a small, white dewlap with a basal yellow blotch.

Anolis limifrons
Slender Anole

Least concern

An exceedingly slender anole, with long limbs and a long tail. Has a fairly uniform tan or grayish dorsal coloration and white undersurfaces that extend onto the lip shields. Tail typically has a series of alternating, broad black and tan rings. Male has a very small dewlap, white with a basal orange spot; no female dewlap. Standard length to 1.7 in (44 mm), total length to 6.1 in (155 mm).

Anolis limifrons is commonly found along the Atlantic slope, from Honduras south to central Panama; it also occurs on the Pacific slope, from central Costa Rica to western Panama; from near sea level to 4430 ft (1350 m).

Natural history

An abundant and widespread species that tolerates a range of environmental conditions. It is most commonly seen in dense, regenerating vegetation or along the edges of open situations in forested regions. When observed, it is often perched on twigs in low vegetation, or low on a tree trunk, between 2 and 7 ft (~0.5 and 2 m) above the ground. It also regularly visits leaf litter on the forest floor, in search of invertebrate prey. Juveniles tend to be more terrestrial than adults. *Anolis limifrons* is one of the more commonly observed anoles in the country, and visitors often spot them on hikes along forest trails, in densely vegetated roadsides, in ornamental gardens, and in plantations. It is found in most areas with a relatively high level of humidity and is absent from the more arid regions of Costa Rica.

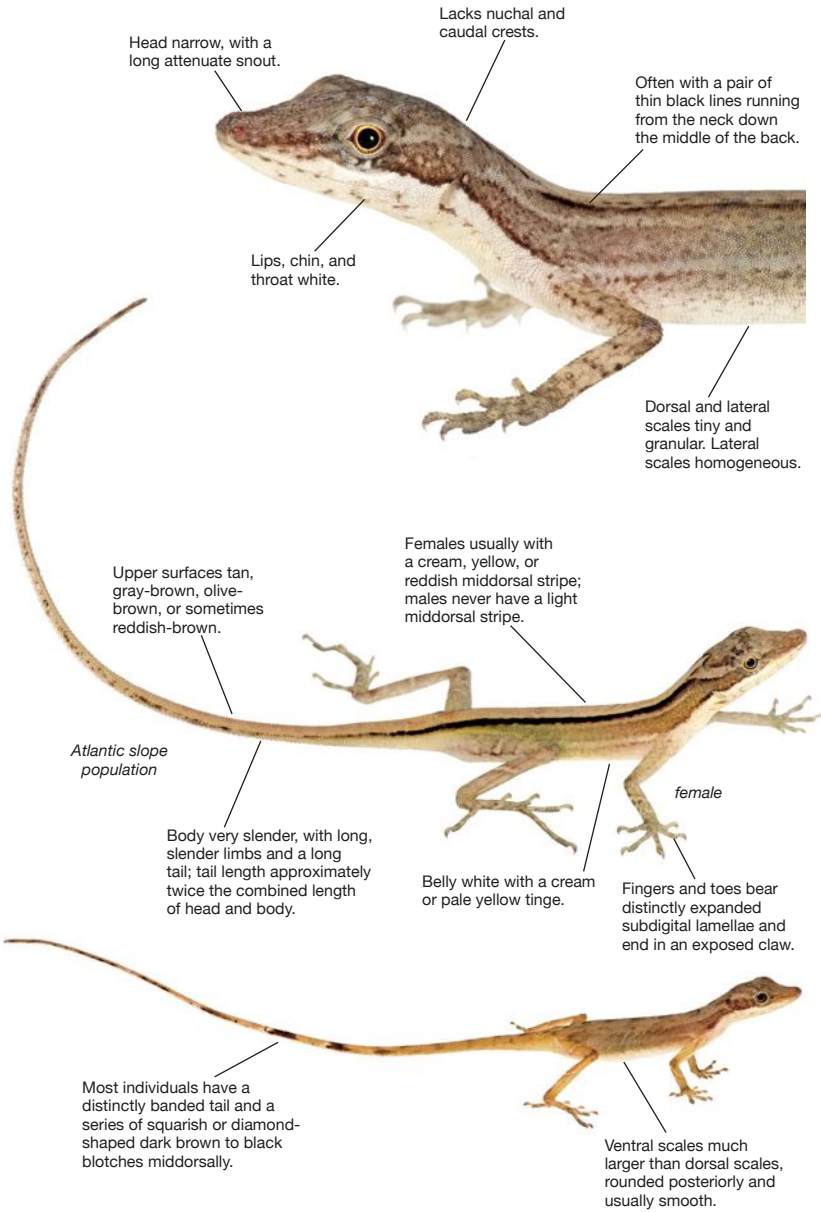
Field observations on this species indicate that a male and female form a strong pair bond and often stay close to each other, generally only a few yards apart. This bond seems to last for most (perhaps all?) of the animal's adult life and is reinforced at regular intervals by head-bobbing displays between the two individuals. Instead of investing time in territorial interactions with other males, which is what most anole species do, male *Anolis limifrons* spend social time maintaining a loose pair-bond with a specific female.

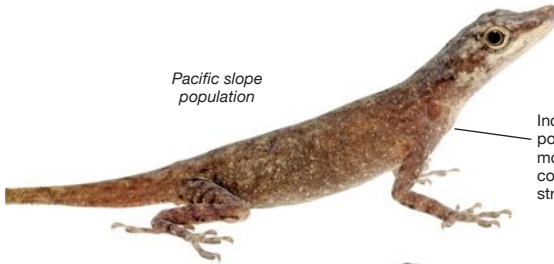
These anoles spend most of the day searching for invertebrate prey, 80% of which is captured on tree trunks and branches; the remaining 20% is caught in leaf litter. On many occasions, adults were observed to jump or run 7–10 ft (2–3 m) to catch prey. Although snakes, birds, and mammals are likely the main predators of these abundant lizards, they have other predators. A juvenile *Anolis limifrons* anole was found caught in the web of a golden orb spider (*Nephila clavipes*). And in one observation, a large hunting spider (*Cupiennius* sp.) attacked and ate an adult.

Anolis limifrons has a very high population turnover rate; females produce a clutch of a single egg every week or week and a half during the rainy season, and every three weeks during the drier months. Hatchlings are tiny, measuring about 1.6 in (40 mm) in total length and mature after about two months. Few individuals live longer than a year.

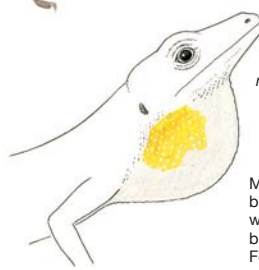
A cryptic form of this species, *Anolis cryptolimifrons*, was recently described from western Panama and has also been identified in a small area in southeastern Costa Rica. It differs from *Anolis limifrons* in details of its hemipenis morphology, but females are indistinguishable. Given the wide geographic range of this species, it is likely that other cryptic forms are hidden within *Anolis limifrons*. For example, Pacific slope individuals of *Anolis limifrons* are noticeably more uniformly dark in coloration, often without the diagnostic black longitudinal stripes, and with less pronounced dark middorsal markings and bands on the tail than on Atlantic slope individuals. Also, a population of unusual individuals, located at intermediate elevations on Irazú and Turrialba volcanoes, warrants a closer look. They are found at elevations of around 4920 ft (1500 m), considerably higher in elevation than most *Anolis limifrons*, and have noticeably keeled ventral scales. These populations were once considered a separate species, *Anolis godmani*, but are currently treated as *Anolis limifrons.* Range-wide research on the *limifrons*-like anoles is needed to assess this situation.

Description





Individuals from Pacific slope populations tend to be slightly more robust and uniformly colored, without black dorsal stripes or a banded tail



Male dewlap is small, extending backward to level of axilla; white with a yellow-orange spot at its base and white dewlap scales. Females lack a dewlap.

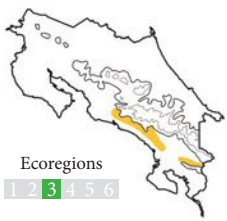
Similar species

- *Anolis cryptolimifrons* (p. 169) is indistinguishable under field conditions; currently it is only known from Cerro Nimaso on the southern Atlantic slope but may be more widespread.
- *Anolis polylepis* (p. 212) is larger. It usually has a light lateral stripe (may be faint). The male has a very large orange dewlap (white and yellow in some populations).
- *Anolis cupreus* (p. 171) is slightly more robust, with silky small scales on its body and rows of noticeably larger and strongly keeled scales on its tail; male dewlap very large, pink with orange and yellow blotches.
- *Anolis carpenteri* (p. 163) has a grayish-green coloration and an orange dewlap.
- *Anolis altae* (p. 153) generally occupies higher elevations; it has very short limbs and an orange dewlap.

Anolis marsupialis
Pacific Ground Anole

Least concern

A relatively small, terrestrial anole. It is dark brown, with a broad band of 8–12 distinctly enlarged middorsal scales. Typically has a deep axillary pocket in the "arm pit" of each front limb. Males with an erectable nuchal crest and a low dorsal ridge (not always visible); dewlap large, red with maroon streaks; no dewlap in females. Standard length to 1.9 in (48 mm).



Anolis marsupialis is currently known only from foothills and middle elevation forests in southwestern Costa Rica, but it likely also occurs in adjacent western Panama; 1150–3935 ft (350–1200 m).

Natural history

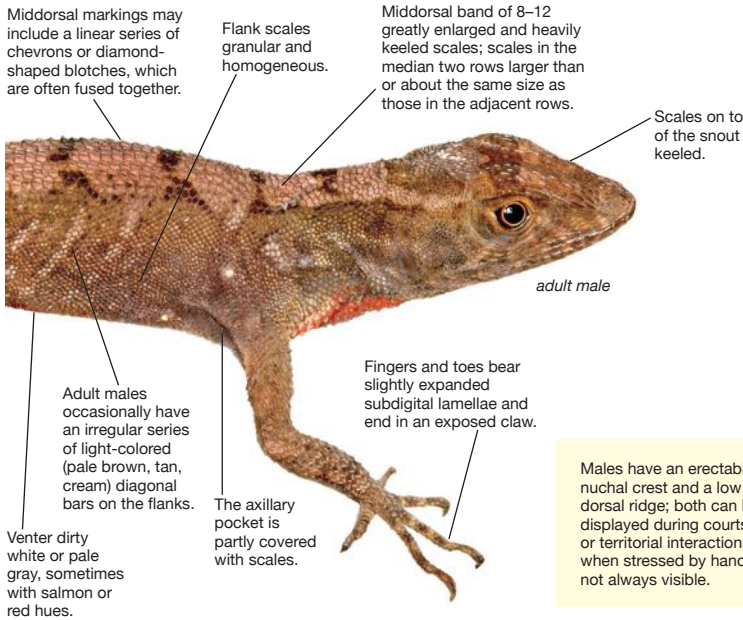
Anolis marsupialis is an uncommon inhabitant of shaded forest interiors. It inhabits the semi-deciduous forests and rainforests of the southern Pacific lowlands and foothills. Like its close relative, *Anolis humilis*, this species inhabits the leaf litter layer of the forest floor. It uses slightly elevated perches such as large logs, rocks, above ground root systems, or the bottom reaches of tree trunks and tree buttresses as a vantage point. These lizards rarely climb more than 2 ft (0.6 m) above the forest floor. Although both males and females utilize these elevated perches, males do so much more frequently than females.

Males generally perch in a head-down position. They engage in head bobbing and dewlap flashing displays with neighboring males to assert their territories, but also to court nearby females. Males display significant site fidelity and tend to return to the same display perch; much of a male's territory is centered on the area visible from his display spot, and resident males rarely venture far from there.

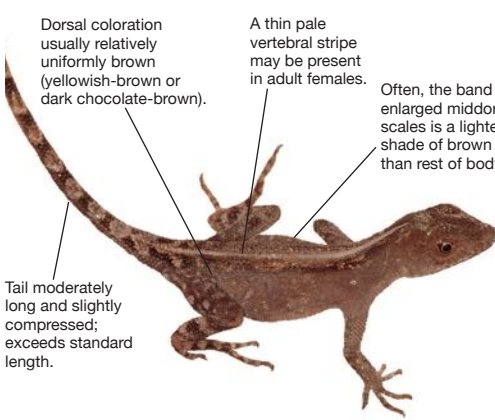
Anolis marsupialis is oviparous and likely breeds year-round; peak breeding season is during the rainy season (April to November), and egg laying may be halted during very dry periods. It eats small invertebrates. In turn, these small lizards are widely preyed upon by a variety of snakes, as well as larger lizards, birds, and even invertebrates such as large wolf spiders.

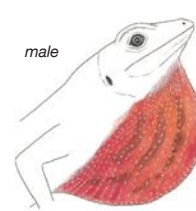
This species was previously considered to be a geographically isolated Pacific slope population of the wide-ranging species *Anolis humilis*. Several decades ago, *Anolis marsupialis* was recognized as significantly different from its Atlantic slope sister species. Its formal description as a separate species, however, did not happen until 2015, and it therefore appears in older publications as *Anolis humilis*.

Description



Males have an erectable nuchal crest and a low dorsal ridge; both can be displayed during courtship or territorial interactions (or when stressed by handling); not always visible.





Male dewlap large; red with several dark red to maroon semicircular streaks. Female dewlap rudimentary.

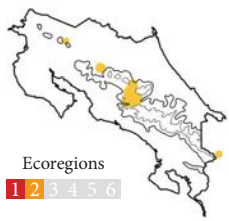
Similar species

- *Anolis humilis* (p. 179) is most similar to this species, but it occurs on the Atlantic slope; its males have an orange-red dewlap with a yellow margin.
- Young *Anolis capito* (p. 161) have a distinctively short snout and lack a broad middorsal band of enlarged scales.
- *Anolis lemurinus* (p. 192) is considerably larger and lacks the broad middorsal band of enlarged scales; males have a small red dewlap with white scales; females have a white dewlap.

Anolis microtus
Banded Giant Canopy Anole

Least concern

A very large, robust lizard found on tree trunks or in canopy. It has short legs, a massive head, and a long tail. Generally has irregularly shaped, oblique dark and light bands on the body and tail; typically a dark-bordered, light stripe extends from behind the eye to the insertion of the front limbs, on each side of the neck. Standard length to 4.4 in (111 mm) in males, and 4.1 in (104 mm) in females; total length to 13 in (331 mm).



Anolis microtus is known from scattered localities along both slopes, between northwestern Costa Rica and extreme western Panama; from 3600 to at least 6400 ft (1100-1950 m).

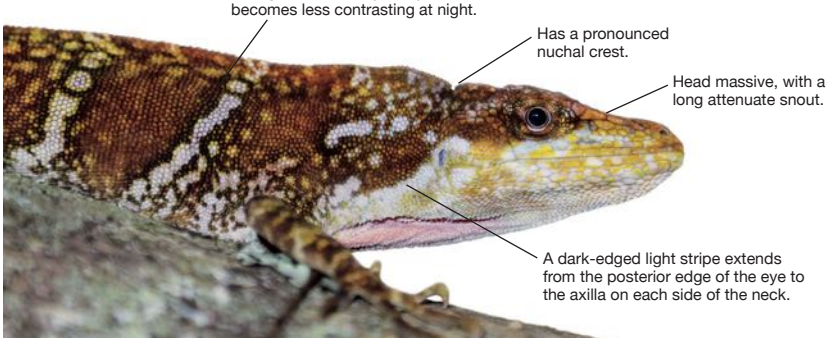
Natural history

Anolis microtus is a denizen of rainforest canopies and the upper reaches of large tree trunks in undisturbed premontane regions. This species is represented in museum collections by less than a dozen specimens, and it is rarely observed in the wild. Given that it occupies the higher canopy of the forest and lives in places few people venture to visit, it is not easy to observe this spectacular lizard. Consequently, very little observational or other natural history information is available for *Anolis microtus*.

This species was until recently thought to be more widespread in western Panama, but most known individuals were recently re-classified as a new species, *Anolis ginaelisae*. Currently only a single Panamanian location, near the Costa Rican border, is known to harbor true *Anolis microtus* (indicated on the distribution map). This Panamanian record suggests that *Anolis microtus* may occur in the Talamanca Mountain Range of Costa Rica in areas between the confirmed localities.

This anole is sometimes included in the genus *Dactyloa*, and is listed as *Dactyloa microtus* in other publications.

Description

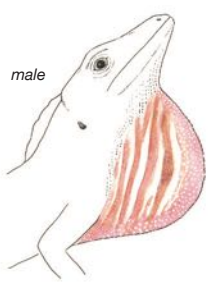


Body yellowish-gray to tan; marked with bold dark brown markings and a series of transverse dark brown or green lateral bands that are distinctly light-centered.

Tail long, banded, with alternating dark and light rings.

Very large and robust, with short legs. Fingers and toes bear distinctly expanded subdigital lamellae and end in an exposed claw.

The dark brown markings on the body, especially the transverse bars, may change to dark green on the ventral surfaces.



male

Male dewlap very large; pale orange to salmon, marked with vertical rows of white scales. Female dewlap large, salmon to pink. The dewlap in young males is pale yellow.

Similar species

- *Anolis insignis* (p. 184) has a pale-centered dark blotch between the tympanum and the insertion of the front limbs; male dewlap orange red.
- *Anolis savagei* (p. 218) has a prominent dark postorbital blotch on each side of the head; male dewlap pale pink with dark streaks.

Anolis monteverde
Monteverde Highland Anole

Critically endangered

A cryptic species, morphologically indistinguishable from the closely related *Anolis altae* except with reference to the color of the adult male dewlap. A relatively nondescript, medium-sized highland anole with a slender body and head, and very short limbs. It lacks crests and conspicuously enlarged middorsal scale rows. Male dewlap medium-sized and rust orange, grading to yellow on free margin; females lack a dewlap. Standard length to 2.0 in (50 mm); total length to 6.1 in (155 mm).

Anolis monteverde is a Costa Rican endemic, only known from the Santa Elena and Monteverde region in the Tilarán Mountain Range; 5070–5215 ft (1545–1590 m)

Natural history

Anolis monteverde is closely related to *Anolis altae*, and was only recently split from that species, mostly based on differences in hemipenis morphology and male dewlap coloration. Females are morphologically indistinguishable from *Anolis altae*, but *Anolis monteverde* is restricted to the Tilarán Mountain Range and its identity can be surmised based on location.

Anolis monteverde is rarely seen. It is active during the day and inhabits the forest floor, low bushes, and tree trunks. Recent observations indicate that it also ascends to the canopy, which may explain its perceived scarcity. An adult male was observed at mid-afternoon as it perched head-down on a mossy vine in the canopy of a large tree and performed a series of dewlap extensions to another male that was located on a branch several yards distant.

Thus far, all known individuals of this species have been found in undisturbed cloud forest and lower montane forest habitat. *Anolis monteverde* does not appear to tolerate habitat alteration and, given its small known distribution range, is is listed as critically endangered.

Description

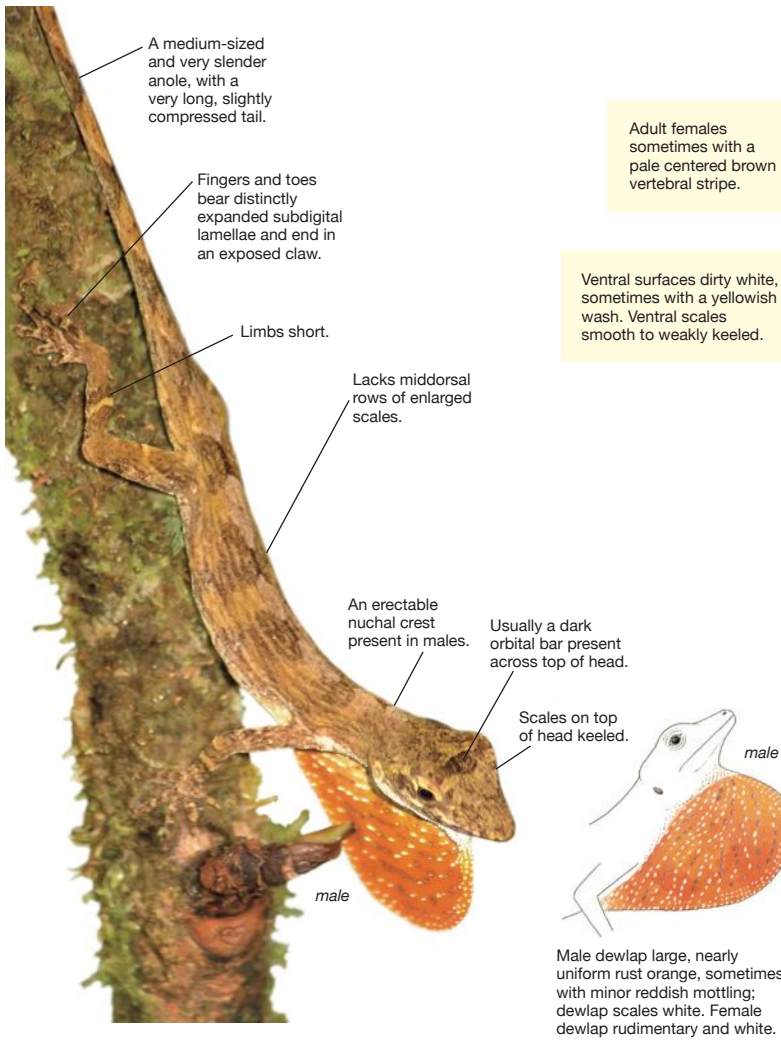
Most dorsal markings subtle; usually has a pattern of pale middorsal X-shaped or butterfly-shaped markings.

A faint light-colored lateral stripe occasionally present.

Body covered with weakly keeled, slightly overlapping scales with a rounded posterior edge. Lateral scales homogeneous, granular, and keeled. Ventral scales smooth to slightly keeled.

Dorsal coloration mostly uniform grayish-brown to reddish-brown.

Description



Adult females sometimes with a pale centered brown vertebral stripe.

Ventral surfaces dirty white, sometimes with a yellowish wash. Ventral scales smooth to weakly keeled.

Male dewlap large, nearly uniform rust orange, sometimes with minor reddish mottling; dewlap scales white. Female dewlap rudimentary and white.

Similar species

- *Anolis altae* (p. 153) is geographically separated but very similar in appearance; males have a yellow-orange dewlap.
- *Anolis carpenteri* (p. 163) is grayish-green and generally occurs at lower elevations.
- *Anolis tenorioensis* (p. 220) is geographically separated but similar in appearance; ventral surfaces marked with dark reticulations, and male dewlap dark red with brown blotches.
- *Anolis cupreus* (p. 171) has longer limbs and a very large pink dewlap with orange and yellow blotches.

Anolis osa
Osa Anole

Data deficient

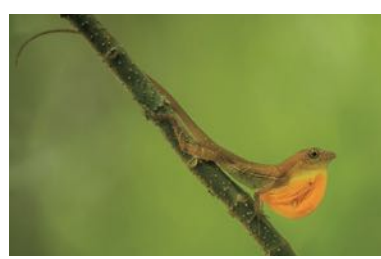
A cryptic species closely related to, and not readily distinguishable from, *Anolis polylepis*, except by hemipenis morphology. Medium-sized and slender; variably colored, but generally marked with a light-colored lateral stripe between its limbs. Males have a low nuchal crest and a very large orange dewlap with yellow scales and margins; females lack a dewlap. Standard length to 2.2 in (57 mm); total length to 6.9 in (175 mm).

Anolis osa occurs only on the Osa Peninsula in southwestern Costa Rica, from near sea level to 1800 ft (550 m). It is morphologically indistinguishable from the more widespread species *Anolis polylepis*, which occupies a wider range in southwestern Costa Rica and adjacent Panama.

Natural history

This cryptic species was described in 2010, based on differences in hemipenis morphology. Males from the Osa Peninsula reportedly have a unilobed reproductive organ (*Anolis osa*), whereas those from the Costa Rican mainland have a bilobed organ (*Anolis polylepis*); a narrow zone of hybridization exists across the base of the Osa Peninsula. Females of both species are indistinguishable, and males show no discernible external characters that help identify them. It is not known whether the differences in reproductive organs actually cause reproductive isolation between the two forms, and more research is needed to clarify this situation. The wide-ranging species *Anolis polylepis* is clearly a complex of different regional forms, with clinal variation from north to south, as well as from lowland populations to those in the foothills. Perhaps it is too early to identify this local form as a distinct species, without addressing the great morphological variety displayed by *Anolis polylepis* across its range.

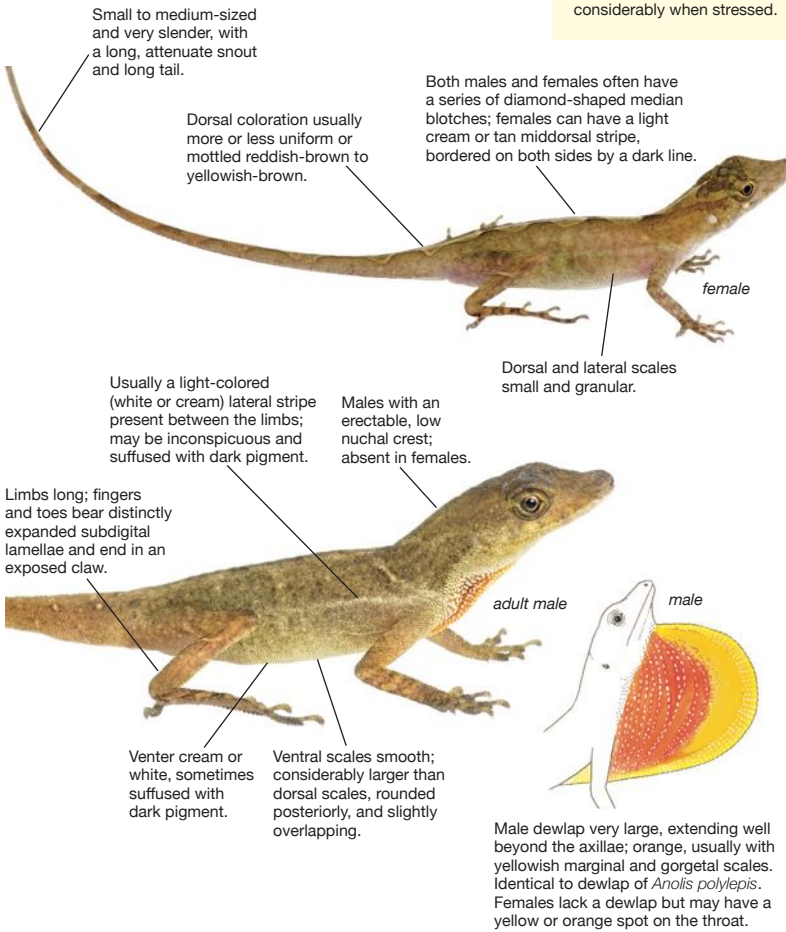
Due to the cryptic nature of this species, no information pertinent to the biology of *Anolis osa* is available, but it is likely similar to lowland forms of *Anolis polylepis*.



Male *Anolis osa* can be nearly invisible when perched on vegetation, until they expose their large dewlap.

Description

These lizards darken considerably when stressed.



Similar species

- *Anolis polylepis* (p. 212) is indistinguishable in the field; geographic provenance is the best key to identity at this point.
- *Anolis cupreus* (p. 171) has a narrow middorsal band of enlarged scales; male dewlap very large and orange, pink, and yellow.
- *Anolis limifrons* (p. 195) does not have a lateral light stripe. Generally the chin, throat, and upper lip shields are uniformly pale; it has a very small white dewlap with a yellow basal spot.
- *Anolis lemurinus* (p. 192) is more robust and lacks a light lateral stripe; males have a small red dewlap and white scales, females a white dewlap.

Anolis oxylophus
Stream Anole

Least concern

A medium-sized semi-aquatic anole. Has an olive-brown body and white lateral stripe and white throat, chin, and belly. Often with a linear series of dark-outlined, white-centered ocelli on the flanks. Male dewlap large, yellow-orange with cream scales; female lacks a dewlap. Standard length to 3.3 in (85 mm) in males, 2.7 in (68 mm) in females; total length to 9.6 in (243 mm).

Anolis oxylophus ranges from eastern Honduras to central Panama on the Atlantic slope; on the Pacific slope, it occurs in southwestern Costa Rica and nearby western Panama. From near sea level to 3935 ft (1200 m).

Natural history

This semi-aquatic anole is almost invariably found near forest streams, where it is seen perched on rocks, logs, and vegetation during the day. *Anolis oxylophus* swims and dives very well; when approached too closely, it seeks refuge in the water. To avoid detection, they sometimes remain submerged with only their head sticking out of the water but may also dive underwater and cling to the underside of a submerged rock or log to escape detection; they can remain submersed for a considerable amount of time by breathing from air pockets trapped underneath these objects.

Anolis oxylophus live in dark, shadowy areas of dense forests, sometimes within the perennially wet spray zones of water falls or in steep ravines cut by streams. They are often active at temperatures that are too low for other species of lizard, and have little tolerance for high temperatures. Individuals held in the hand just a short period of time can show signs of heat stress.

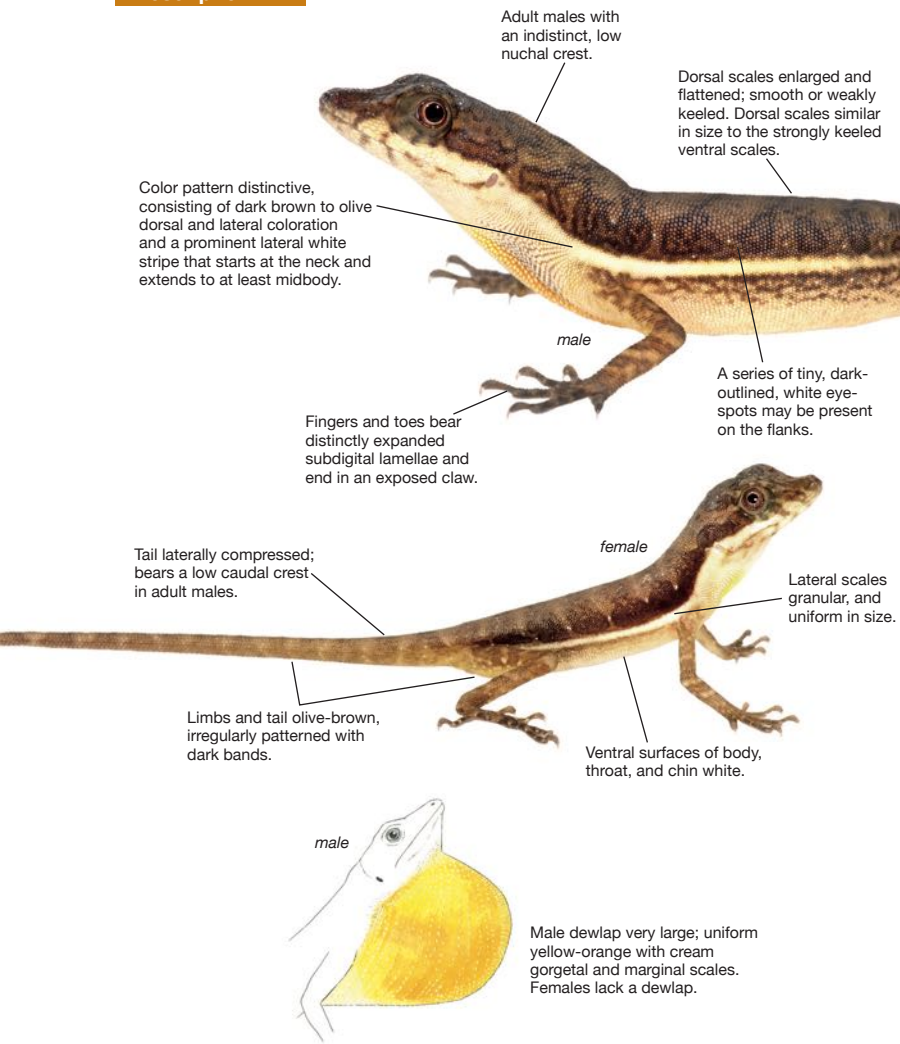
Reproduction in this species takes place year-round. Eggs are deposited in moist places, usually in moss mats or other humid microclimates along stream banks.

At night, these lizards often retreat into rock crevices or into the accumulations of woody debris at the high-water line, but they can also be seen sleeping on low vegetation.

Anolis oxylophus is insectivorous and eats a variety of small invertebrates.

Anolis oxylophus is almost always found near streams and rivers. When startled, these lizards often escape into the water. They are adept swimmers and regularly dive below boulders to hide from predators.

Description



Similar species

- *Anolis aquaticus* (p. 155) has blue eyes, a dorsal pattern of transverse oblique stripes, and a dark orange dewlap with lighter stripes.
- *Anolis polylepis* (p. 212) has a light lateral stripe but lacks solid olive to brown dorsal coloration; has a very large yellow-orange dewlap.

Anolis pachypus
Cloudforest Anole

Least concern

A stocky, medium-sized anole in the *Anolis pachypus*-complex; nearly indistinguishable from related species by morphology alone. As a group, recognized by the dark bar across the head between the eyes, and a light stripe emanating from behind the eye, past the corner of the mouth and onto the neck. Male dewlap medium-sized, orange-red with a central yellow spot, and with cream dewlap scales; female dewlap small and white. Standard length to 2.0 in (51 mm) in both sexes; total length to 6.3 in (160 mm).

Anolis pachypus occurs locally at middle elevations of the Talamanca Mountain Range of southern Costa Rica and adjacent western Panama; 4500–8200 ft (1372–2500 m).

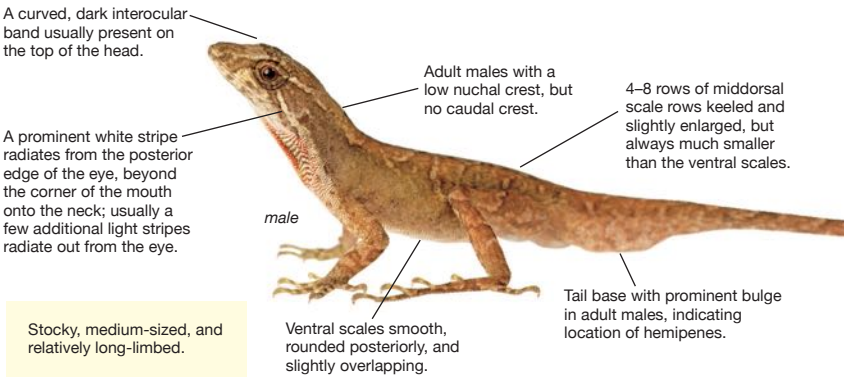
Natural history

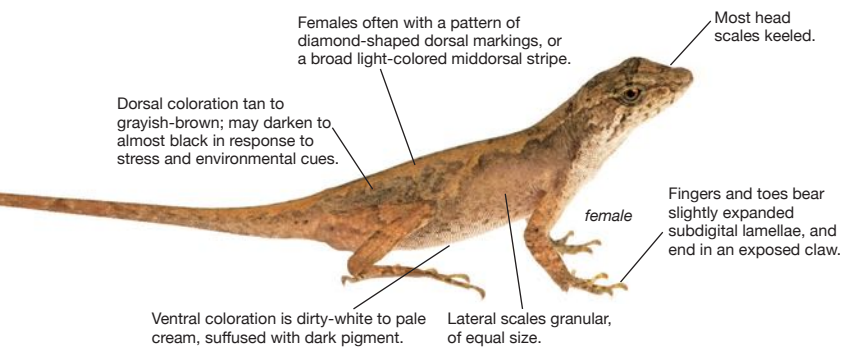
Anolis pachypus is a confusing species that is often mistaken for *Anolis tropidolepis*, and it is thus difficult to separate biological data for the two forms. The two species are undoubtedly quite similar in their biology, however. *Anolis pachypus* is found in the wet, cool upper reaches of Costa Rica's mountain ranges, generally at even higher elevations than *Anolis tropidolepis*. It is relatively common in its range, and can be found in moderately altered habitats, even in very close proximity to humans. *Anolis pachypus* is not always easy to see because the often wet and cool climatic conditions may limit its surface activity.

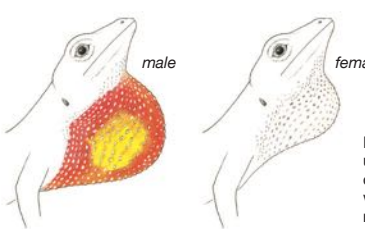
This day-active lizard is most frequently seen on the ground, low on twigs, or perched on tree trunks, logs, or fence posts. It usually occupies perches less than 7 ft (~2 m) above the ground; at night, individuals were found sleeping on exposed twigs along forest edges, in isolated bushes surrounded by pasture, and in scrubby vegetation alongside mountain streams. When weather conditions are suboptimal, *Anolis pachypus* retreats under cover objects or perhaps even into burrows underground. Individuals have been encountered under logs and wood piles on rainy days. Its diet consists of invertebrates, which are caught with a rapid dash. Since these lizards tend to operate at a body temperature that is equal to, or only slightly higher than, the ambient temperature, they are significantly less speedy than many lowland anoles that function at higher body temperatures.

Anolis pachypus is oviparous; reproduction likely takes place year-round. Females lay a single egg at a time, at intervals of a few weeks.

Description







Male dewlap moderate-sized; orange-red, usually with a central yellow spot and cream dewlap scales. Females have a very small white dewlap, or sometimes only an orange-red spot on the throat.

Similar species

- *Anolis benedikti* (p. 157) practically co-occurs in Las Tablas but tends to inhabit the Atlantic slope; males have a reddish-orange dewlap with a broad yellow anterior margin.
- *Anolis tropidolepis* (p. 224) has mostly keeled ventral scales and a pinkish-red dewlap without a central yellow spot.
- *Anolis alocomyos* (p. 151) has a purplish-red dewlap.
- *Anolis leditzigorum* (p. 190) has a purplish-red dewlap.
- *Anolis laeviventris* (p. 188) has minute, granular flank scales interspersed with enlarged white tubercles; males have a white dewlap and a nuchal crest.
- *Anolis humilis* (p. 179) has a middorsal row of greatly enlarged scales; male dewlap bright orange-red with a narrow yellow margin.

Anolis pentaprion
Atlantic Lichen Anole

Least concern

Medium-sized and robust, with a pointed snout, a distinctly serrated crest on its compressed tail, and an unusual lichenlike pattern of diffuse white spots on a gray to brown background. Dewlap in both sexes bright pink, with irregular purple streaks and white scales. Standard length to 3.1 in (79 mm) in males, 2.5 in (63 mm) in females; total length to 7.0 in (178 mm).

Anolis pentaprion ranges along the Atlantic slope, from southeastern Nicaragua southward to northwestern Colombia; it also occurs on the Pacific slope of eastern Panama; from near sea level to 2950 ft (900 m).

Natural history

This is an infrequently seen anole of relatively undisturbed, humid forests. *Anolis pentaprion* is highly arboreal and generally inhabits the canopy and subcanopy of large trees. Individuals tend to bask on the outside of the tree crown, perched on top of leaves or small twigs. Unlike other anoles, this species has been observed to use its flexible, serrated tail as an anchor. When avian predators are detected, basking individuals drop below the foliage, into the tree crown; agile raptors such as the american swallow-tailed kite (*Elanoides forficatus*) have regularly been observed plucking these lizards from their perch.

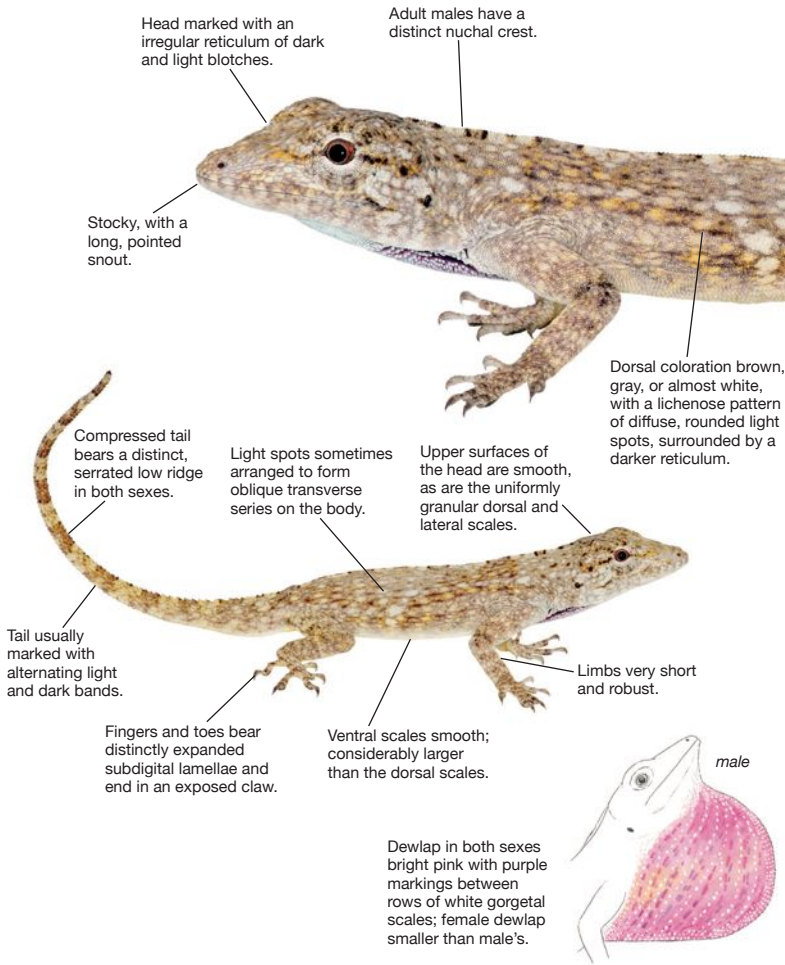
Due to its preference for edge situations, this species can tolerate substantial clearing of its habitat; *Anolis pentaprion* persists in greatly disturbed or altered habitats, as long as some tall trees are left standing. Individuals have also been observed on posts and walls of man-made structures that were located near the forest edge. When discovered on a tree trunk or other vertical perch, these lizards will press themselves flat against the surface, which is made easier by their short limbs, and discreetly edge away from the observer to hide on the opposite side of the perch.

Anolis pentaprion is an active hunter of a variety of invertebrate prey, but reportedly favors small flying insects such as beetles and flies. This specialization is thought to be an adaptation to life in the treetops, where such prey may be abundant.

Like some other Costa Rican members in the *Anolis pentaprion*-group (e.g., *Anolis fungosus*, *Anolis salvini*), *Anolis pentaprion* has a black lining in its mouth and throat. The exact function of this coloration is unknown, but individuals sometimes gape with the mouth wide open when captured. Similar behavior and coloration of the mouth's interior is also seen in the snake *Oxybelis aeneus* and may aid in deterring predators.

Based on historic records, this species once occurred near San José, in the eastern Central Valley; however there have not been any recent sightings of *Anolis pentaprion* from that area and decades of development have likely rendered the habitat unsuitable. Pacific slope populations were separated into a distinct species, *Anolis charlesmyersi*, in 2010.

Description



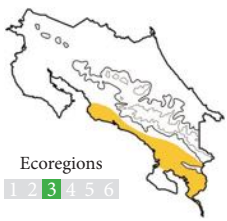
Similar species

- *Anolis charlesmyersi* (p. 165) occurs only on the Pacific slope; male dewlap brick-red with only few widely spaced scales, female dewlap similar in color but smaller.
- *Anolis fungosus* (p. 177) is a rare, small highland species with a pair of characteristic bony knobs on the parietal region of the head; male dewlap red with white scales, female dewlap pale yellow.
- *Anolis salvini* (p. 216) is a rare highland species with a distinctive V-shaped interorbital dark bar across the top of the head; male dewlap red, female dewlap orange, red, or blue.

Anolis polylepis
Golfo Dulce Anole

Least concern

A very common medium-sized, slender anole; variably colored but generally marked with a light-colored lateral stripe between its limbs. Males have a low nuchal crest and a very large orange dewlap with yellow scales and margins; females lack a dewlap. Standard length to 2.2 in (57 mm) in males, and 2.1 in (53 mm) in females; total length to 6.9 in (175 mm).



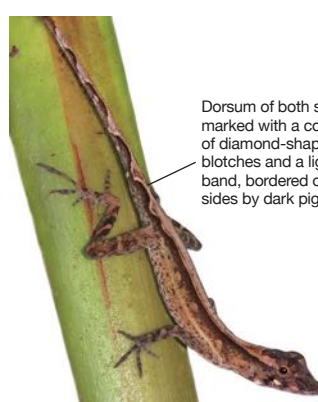
Anolis polylepis occurs in southwestern Costa Rica and adjacent western Panama, from near sea level to 4750 ft (1450 m). Some authors regard individuals from the Osa Peninsula as belonging to the morphologically identical cryptic species, *Anolis osa*.

Natural history

This strictly diurnal species is abundant within its limited range. It is invariably found on the ground or on low vegetation no higher than 7 ft (~2 m) above the ground. At lower elevations, *Anolis polylepis* is generally found in forested settings, although it does tolerate some habitat alteration. Towards the higher end of its altitudinal range, this species occurs in edge situations, where forest meets open areas. At higher elevations, it is regularly seen in agricultural areas with a mosaic of pastures and forest remnants, where it occupies isolated shade trees or even fence posts.

Anolis polylepis hunts for invertebrate prey in the leaf litter; individuals are often seen perched in a head-down position on an elevated perch, usually a tree trunk, while scanning their environment. Males vigorously defend their home range against intruding males, initially by displaying the dewlap and bobbing the head, but they will resort to fighting if necessary. Male territories overlap with a few female territories, which are smaller and mostly used for feeding, although they usually also include a suitable oviposition site. A single leathery-shelled egg is produced every 1–2 weeks; mating and egg-laying take place year-round but increase in intensity at the beginning of the rainy season (May–June). The young hatch after an incubation period of about 50 days and reach sexual maturity after 3–4 months. Most individuals probably do not live for more than a year.

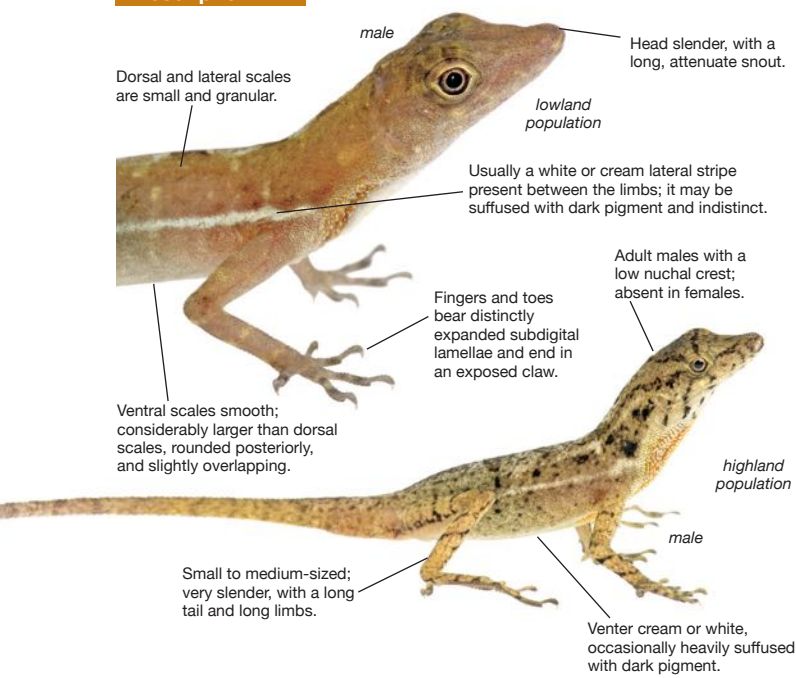
Anolis polylepis displays considerable geographic variation. A cryptic form, differentiated by details in hemipenis structure but otherwise morphologically indistinguishable, is recognized by some authors as *Anolis osa*. It should be noted that at the limits of the range of *Anolis polylepis*, there are distinctly divergent forms of this species, suggesting even more taxonomic challenges. In the northernmost part of its range, near Parrita, lowland individuals of this species have a very large white dewlap, with a yellow basal blotch, rather than the large, orange dewlap with yellow scales and a yellowish margin seen throughout much of its range. Likewise, at high elevations, in the region of Las Alturas de Coton, in the Talamanca Mountain Range, these lizards have a large yellow-orange dewlap, marked with dark orange semicircles and

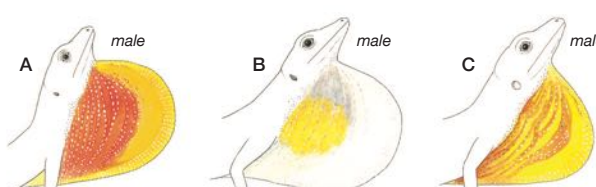


Dorsum of both sexes often marked with a combination of diamond-shaped median blotches and a light median band, bordered on both sides by dark pigment.

white scales. Furthermore, the color pattern in these highland *Anolis polylepis* tends to contain more prominent dark markings than the lowland forms. It is currently not known whether these morphological differences translate into reproductive isolation, and further research is needed to evaluate the diversity of *Anolis polylepis* throughout its range, as it undoubtedly represents a complex of cryptic species.

Description





Male dewlap very large, extending well beyond the axillae. **A.** Throughout much of its lowland range, dewlap is orange, usually with yellowish marginal and gorgetal scales (identical to dewlap of *Anolis osa*). **B.** Populations from near the northern edge of its range (roughly north of Dominical) have a white dewlap with a large, yellow basal blotch. **C.** Highland populations tend to have a bright yellow-orange dewlap, usually with orange streaks and yellowish marginal and gorgetal scales. All females lack a dewlap but may have a yellow or orange spot on the throat.

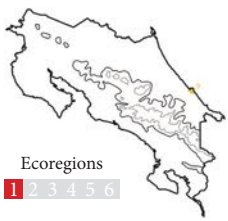
Similar species

- *Anolis osa* (p. 204) is morphologically identical but is geographically restricted to the Osa Peninsula.
- *Anolis limifrons* (p. 195) is more slender, lacks a light lateral stripe, and its undersurfaces are generally all white; it has a very small white dewlap with a basal yellow spot.
- *Anolis cupreus* (p. 171) has a large dewlap with a pink margin, orange and yellow center, and often a white base; it also differs in having strongly keeled ventral scales.

Anolis sagrei
Cuban Brown Anole

Introduced

A terrestrial brown anole. Medium-sized, with an erectable nuchal and dorsal crest in males, and a distinctly compressed tail that is topped with a serrated scaly ridge. Male dewlap orange-red with a broad yellow margin; female dewlap similar but smaller. Standard length to 2.1 in (54 mm) in males, 1.7 in (43 mm) in females; total lenth to 3.1 in (180 mm).



Anolis sagrei originates in Cuba and the Bahamas but has been introduced to other areas and is currently established along the Atlantic coast of most countries in Central America. It also occurs widely in Florida and other southeastern states in the US, as well as in Ecuador, Taiwan, and Singapore. In Costa Rica, *Anolis sagrei* is found on the Atlantic coastal plain, near sea level.

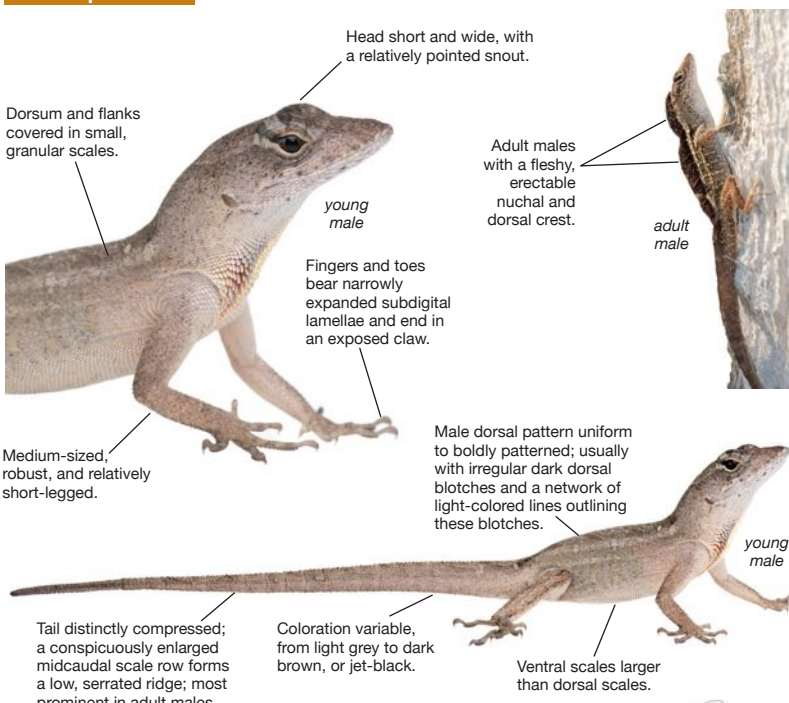
Natural history

Anolis sagrei is a recently introduced, non-native anole. It is terrestrial and semi-arboreal, generally seen on rocks, low on tree trunks, or in low vegetation. Unlike most Costa Rican anoles, this species is often seen running and jumping as it chases after invertebrate prey or interacts with others of its species. *Anolis sagrei* is highly adaptable and inhabits a variety of habitats; it prefers relatively open areas and is known to be abundant in urban settings in other countries in which it was introduced. Its ability to survive in highly modified habitats has enabled it to rapidly colonize new regions and outcompete native species. In Florida, it is now the most abundant reptile species to occur there.

During the breeding season, males vigorously defend their territories and often display their dewlap to deter other males and to attract females. Territorial fighting between males is common in areas with high population density; physical interaction, including biting and knocking each other off perches, often follows visual communication using dewlap displays. After mating, females can lay a single egg roughly every week, although in some populations they may lay two eggs at a time. Eggs are generally deposited on the ground, in the leaf litter layer, or under decaying vegetation. Incubation may take two to three months. Young can take up to a year to reach sexual maturity, but likely do not live more than roughly two years.

Anolis sagrei is known to prey on young of its own species, as well as on other anoles and geckos. Little is known about its distribution and long-term survival in Costa Rica, but this species has the potential to spread and establish itself rapidly in developed areas. If *Anolis sagrei* attains a high population density, it may adversely impact native lizard species, and its potential spread in the country should be carefully monitored.

Description



Female coloration variable; dorsum generally has a light-colored stripe bordered by a series of dark triangles.

Male dewlap orange-red with a broad yellow free margin; females with small orange-red dewlap with a pale border. Dewlap scales light-colored but may darken to nearly black when stressed.

Similar species

- *Anolis humilis* (p. 179) also has a reddish-orange dewlap with a yellow margin but differs in having a middorsal band of greatly enlarged scales.
- *Anolis cristatellus* (p. 167) has nuchal, dorsal, and caudal crests, and a greenish-yellow dewlap with a pale orange margin.
- *Anolis limifrons* (p. 195) is exceedingly slender, with white undersurfaces and alternating, broad light and black rings around the tail. Male dewlap very small; white, with a yellow basal spot.

Anolis salvini
Squeaking Lichen Anole

Least concern

A small anole with short legs. Has a mottled, lichenlike color pattern and a bold interorbital bar across the top of its head; the posterior edge of the bar tends to project backward in a slight V-shape. Dewlap moderate in size, red in males, blue in females. Standard length to 2.2 in (57 mm), total length to 5.2 in (132 mm).

Anolis salvini is only known from a few individuals found on the Pacific slopes of the Talamanca Mountain Range, from San Isidro del General, in Costa Rica, southward into western Panama; 3600–6725 ft (1100–2050 m).

Natural history

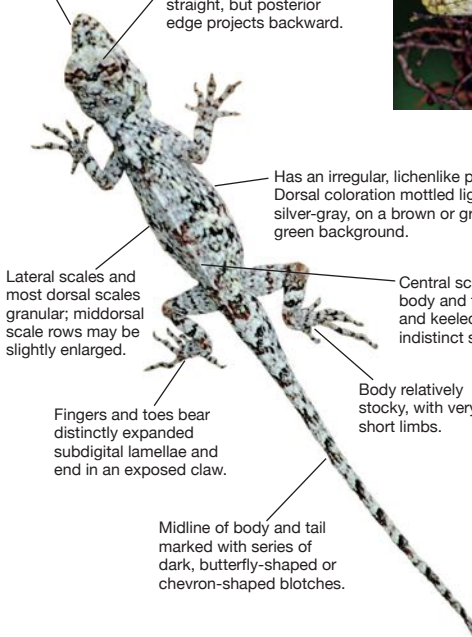
Anolis salvini is a poorly known highland species. In Costa Rica it is only recorded from three sites, all with relatively undisturbed cloud forest habitat. There are recent records from western Panama and from the San Isidro del General area in Costa Rica, which extend the known range of this species both northward and southward. This species was described in 1971 as *Anolis* (*Norops*) *vociferans*, but its characteristics were later considered to be consistent with those of the previously described *Anolis salvini*, and the latter, older name took precedence.

There is little information on its natural history beyond the fact that it is arboreal and inhabits a variety of habitats at intermediate elevations. *Anolis salvini* has been found in relatively undisturbed cloud forests, stunted ridgeline elfin forest, and in clumps of trees persisting in agricultural fields and plantations. Most individuals were discovered at night as they slept exposed on vegetation 2–15 ft (0.5–5 m) above the ground.

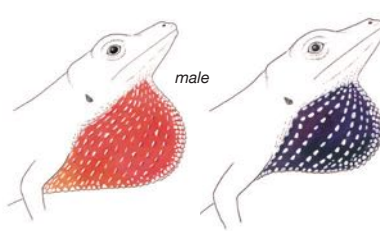
Interestingly, this is one of few anole species that is capable of producing a high-pitched squeak when distressed. Individuals of both sexes vocalized readily when captured at night in their sleep, but were less likely to do so during the day. It is unclear what the exact function of these vocalizations is. If meant to serve as an antipredator response, it is not clear what potential predators would be deterred by the sounds, especially since the main nighttime predators of sleeping anoles tend to be arthropods, which are not generally deterred by distress calls.

Another interesting aspect of this species is that males have a red dewlap, while the female's dewlap ranges from red, to orange, to dark blue, or even a pale silver-blue in recently discovered Panamanian individuals. It is not known if this degree of variation exists in Costa Rican *Anolis salvini*, but it may indicate that a complex of several cryptic forms is currently included within this species. Further research is needed to better understand the phylogeny and biology of this anole.

Description



Interior lining of mouth and throat is black; skin in corners of mouth bright blue. Both are sometimes shown during defensive display.



Male dewlap moderate in size and red; female dewlap smaller and red, orange, purplish-blue, or pale blue. On both, dewlap scales white, but can darken significantly.

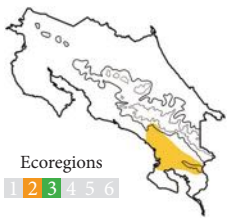
Similar species

- *Anolis fungosus* (p. 177) has a unique pair of scale-covered, bony knobs in the parietal area on top of its head; male dewlap red with white scales, female dewlap pale yellow.
- *Anolis charlesmyersi* (p. 165) occurs at lower elevations on the Pacific slope; it is a larger species, with a brick red dewlap.
- *Anolis pentaprion* (p. 210) is larger and has a bright pink dewlap; it occurs at lower elevations on the Atlantic slope.

Anolis savagei
Savage's Giant Canopy Anole

Not assessed

A very large anole. Has a prominent dark postorbital blotch on each side of the head; also note several dark brown or dark gray oblique stripes on its flanks that each contain a series of light-centered spots. Male and female dewlap pale pink, with dark streaks. Standard length to 5.5 in (141 mm) in males; females only known from a single juvenile. Total length to 18.0 in (457 mm).



A Costa Rican endemic, *Anolis savagei* is primarily found at middle elevations on the Pacific slopes of the Talamanca Mountain Range of southwestern Costa Rica, in Chirripo National Park and San Vito; from near sea level to at least 5215 ft (1590 m).

Natural history

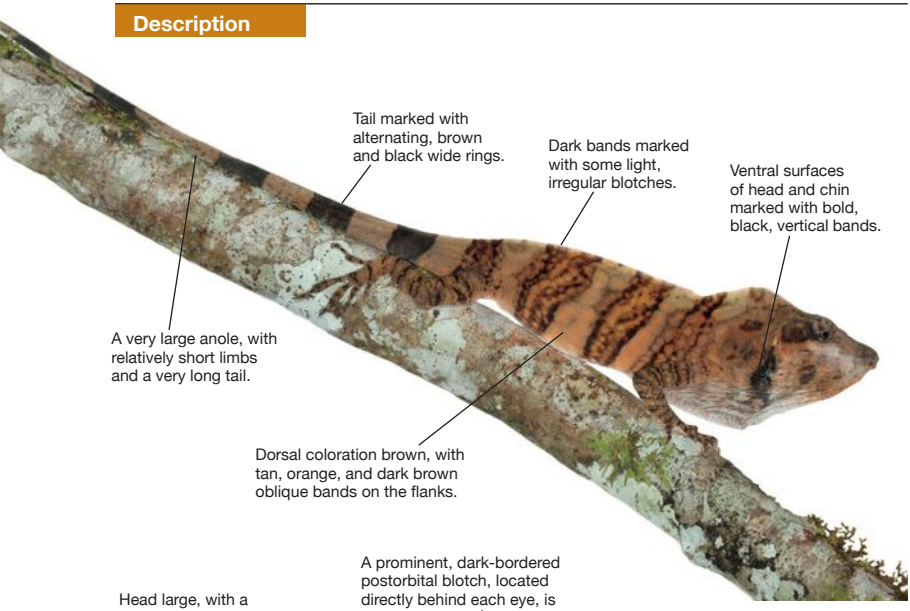
Only described in 2017, this is one of the most recent additions to the reptile fauna of Costa Rica. It is one of several rare, giant canopy anoles that are known from only a few individuals. As new observations and specimens become available, biologists will be able to better establish the identity of these secretive species. *Anolis savagei* is most closely related to *Anolis insignis*, and individuals from southwestern Costa Rica were previously assigned to the latter species. Recent detailed analysis of individuals from Las Cruces Biological Station, in the southern Talamanca Mountain Range, revealed that they differ from *Anolis insignis* in several aspects of scalation, color markings, and dewlap coloration. In retrospect, additional records from near Chirripó National Park and from the lowlands near Rincón de Osa seem to be attributable to this new species, but more research is needed to adequately delineate its distribution range.

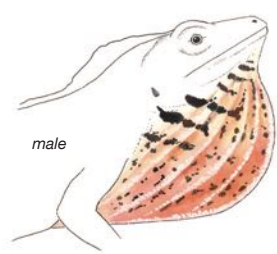
Anolis savagei is a large anole of tree trunks and large branches in the canopy, and rarely descends to heights that afford easy observation. The few individuals for which there is specific data were found at night sleeping on narrow tree branches, approximately 15–20 ft (5–6 m) above the ground. The lizards were found in an area of regenerating forest with a dense, closed canopy, but other observations of this species were made in the lush, but landscaped, Wilson Botanical Gardens near the Las Cruces Biological Station, indicating that this species is able to tolerate some habitat modification. One individual was reportedly seen in a dense stand of large palms.

Virtually nothing is known about the natural history of this species. Presumably it feeds on relatively large invertebrates but given its size it may be capable of feeding on smaller lizards and other small vertebrates. All anoles reproduce by laying eggs, and by extension the same is likely true for *Anolis savagei*. However, it is uncertain whether eggs are deposited in epiphyte masses in the canopy, or on the forest floor.

This species was originally placed in the genus *Dactyloa* and therefore occurs in some literature as *Dactyloa savagei*.

Description





Similar species

- *Anolis insignis* (p. 184) has a distinct dark-bordered blotch between the tympanum and shoulder; also has a large orange to red dewlap with greenish-white or cream stripes.
- *Anolis microtus* (p. 200) has a dark-bordered, light stripe behind each eye that extends to the insertion of the front limbs; its dewlap is pale orange to salmon, marked with vertical rows of white scales.

Anolis tenorioensis
Tenorio Anole

Critically endangered

A medium-sized highland anole with a slender body and head and very short limbs. It lacks crests and conspicuously enlarged middorsal scale rows. Dorsum is fairly uniform in color or lightly mottled gray, tan, or reddish brown; has a white upper lip area. Ventral surfaces of body and limbs dirty-white, with dark reticulations. Male dewlap medium-sized, dark red with brown blotches; females lack a dewlap. Standard length to 1.8 in (45 mm); total length to 5.5 in (140 mm).

Anolis tenorioensis is a Costa Rican endemic, currently only known from the cloud forest near the summit of Tenorio Volcano in the Guanacaste Mountain Range, at an elevation of 3800 ft (1160 m).

Natural history

This rare species is currently only known from three individuals found near the summit of Tenorio Volcano in Guanacaste. All were collected at night as they were sleeping on vegetation along the edge of a small clearing that was created by a previous tree fall in dense cloud forest. *Anolis tenorioensis* is closely related to *Anolis monteverde* and *Anolis altae*; it differs only in minor morphological details, particularly aspects of its hemipenis morphology. Externally, *Anolis tenorioensis* differs in male dewlap color, as well as the dark reticulations on its venter; females, virtually impossible to distinguish from related species, are best identified based on the basis of geographic provenance.

Other species in this group tend to be diurnal, actively moving about on the forest floor or low on tree trunks and shrubby vegetation. Limited observations indicate that these lizards may also climb into the forest canopy. *Anolis tenorioensis* feeds on invertebrate prey.

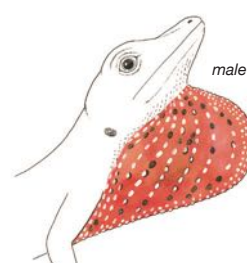
Several regional populations previously included in *Anolis altae* have been split off in recent years, including *Anolis tenorioensis*. Individuals from Cacao Volcano, in Guanacaste, may represent this species or may constitute a different, undescribed form altogether. Additional research is needed to clarify this situation.

Anolis tenorioensis is considered critically endangered primarily based on the assumption that it only occupies a very small distribution range. The entire species could therefore be significantly impacted by any catastrophic changes to its habitat. Fortunately, it occurs entirely in forest protected within Tenorio Volcano National Park.

Description

Dorsal coloration of body and head tan, brown to yellowish-gray, with faintly indicated and irregularly shaped diagonal crossbands on the body and tail; crossbands are slightly darker in hue than dorsal coloration.

Body with small, weakly keeled scales; no series of middorsal enlarged scales. Ventral scales smooth to slightly keeled.



Male dewlap medium-sized, dark red with brown blotches.

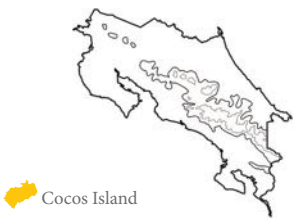
Similar species

- *Anolis altae* (p. 153) is separated geographically but very similar in appearance; males have a yellow-orange dewlap.
- *Anolis carpenteri* (p. 163) is grayish-green in coloration and generally occurs at lower elevations.
- *Anolis monteverde* (p. 202) is geographically separated but similar in appearance; ventral surfaces not marked with dark reticulations, and male dewlap reddish-orange.
- *Anolis laeviventris* (p. 188) has distinctly enlarged tubercles mixed into its granular flank scales; males with a white dewlap.
- *Anolis cupreus* (p. 171) has longer limbs and a very large pink dewlap with orange and yellow blotches.

Anolis townsendi
Cocos Island Anole

Least concern

The only anole on Cocos Island. Coloration variable, but generally has a dark dorsum marked wth a broad, light-colored (dirty-white, cream, pale yellow) lateral band along each side of the body. Male dewlap yellow, with an orange center and base; females with a very small white dewlap. Standard length to 1.9 in (49 mm).



Anolis townsendi is a Costa Rican endemic. It is only found on Cocos Island, located approximately 340 miles (550 km) off the Pacific coast of mainland Costa Rica; from sea level to 2080 ft (634 m).

Natural history

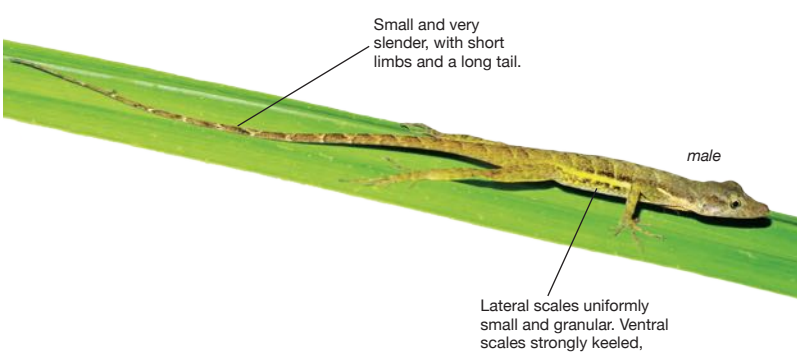
Anolis townsendi is abundant on Cocos Island. It can be found virtually anywhere on the island, from beachside vegetation to the cloud forest in the interior. It is generally found fairly close to the ground but has been observed in treetops at a height of at least 32 ft (10 m).

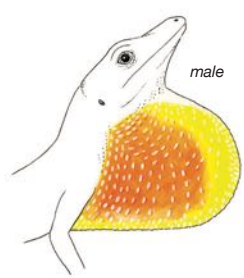
During the day, these lizards are highly visible throughout the island; due to their high densities, male *Anolis townsendi* engage in intensive territorial posturing, which predominantly involves dewlap flashing and posturing towards neighboring males. At night, all age classes can be found sleeping on twigs and leaves in low vegetation.

Interestingly, in many individuals with a regenerated tail, the regrown section is crooked or forked.

The relationship between mainland anoles and *Anolis townsendi* is still unknown.

Description





Similar species

- The only other species of lizard found on Cocos Island is a small gecko (*Sphaerodactylus pacificus*), p. 131.

Anolis tropidolepis
Costa Rican Cloudforest Anole

Least concern

A robust, medium-sized anole in the *Anolis pachypus*-complex; nearly indistinguishable from related species by morphology alone. As a group, recognized by the dark bar across the head between the eyes, and a light stripe emanating from behind the eye, past the corner of the mouth and onto the neck. *Anolis tropidolepis* male dewlap is moderate-sized, pinkish-red with cream dewlap scales; female dewlap rudimentary and white. Standard length to 2.3 in (59 mm) in both sexes; total length to 6.3 in (160 mm).

Anolis tropidolepis occupies middle elevations of the eastern Central Mountain Range, Irazú Volcano, and the western Talamanca Mountain Range; 4000–8200 ft (1220–2500 m).

Natural history

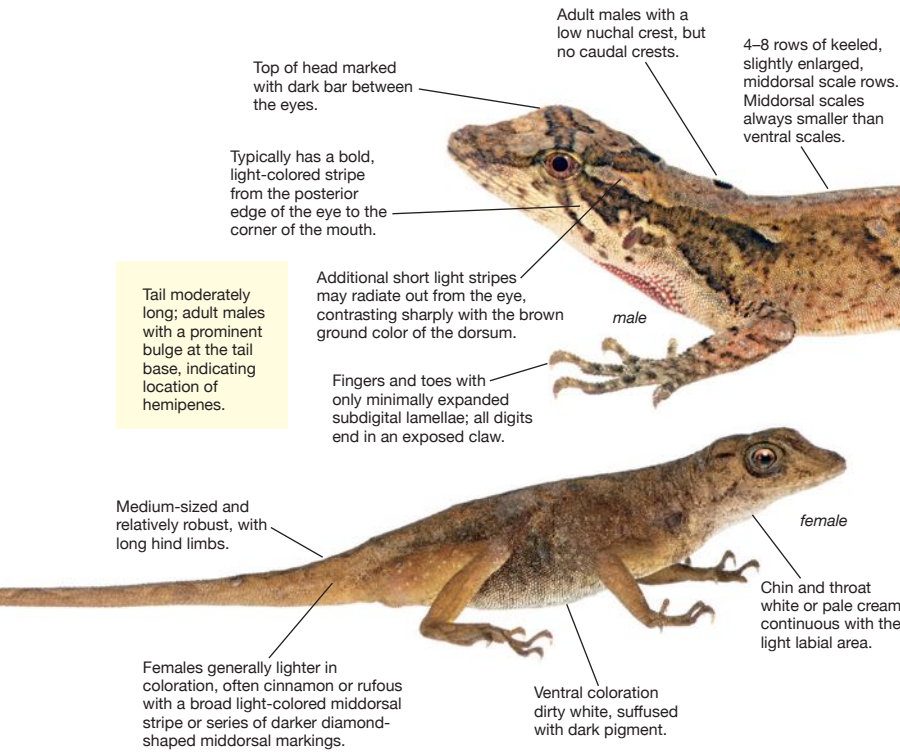
This is a common, day-active lizard of cool, middle-elevation forests. It is primarily terrestrial, but occasionally ascends epiphyte laden trees at heights of 5–7 ft (1.5–2 m) when it forages for insect prey. Due to the relatively low ambient temperatures in its montane habitat, surface activity is somewhat restricted by the prevalent air temperature. *Anolis tropidolepis* is a thermocomformer, meaning that its body temperature is roughly equivalent to the prevailing air temperature, and individuals of this species do not move quite as rapidly as some of the lowland *Anolis*, which are able to operate at higher temperatures. Nevertheless, these lizards will immediately dash for cover when disturbed.

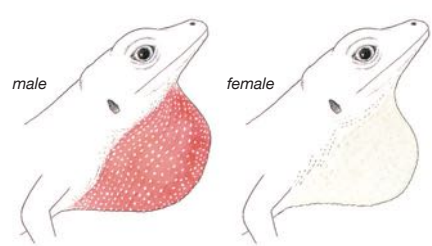
Anolis tropidolepis reportedly has a restricted home range and displays a high level of perch fidelity, an unusual characteristic for members of this genus. Reproduction takes place year-round, and females produce one egg at a time, at intervals of roughly 20–30 days. Juveniles reach sexual maturity in 8–9 months.

Anolis tropidolepis is a common species of cloud forest and lower montane forest but also persists in substantially altered habitats. It is often found in open situations, especially on vegetated road banks, on epiphyte-covered fence posts, and along the felled, overgrown logs that are left lying in high-elevation pastures.

In recent years, a few cryptic forms have been removed from *Anolis tropidolepis*, most notably *Anolis alocomyos* and *Anolis leditzigorum*, which are likely its closest relatives. Another similar and widespread species, *Anolis pachypus,* tends to inhabit even higher elevations than does *Anolis tropidolepis*. These and other members of the *Anolis pachypus*-complex may be difficult to identify under field conditions, especially the females. Males may be distinguished based on their dewlap coloration. Since these species tend to live isolated in different mountain regions, the best key to identification may be geographic provenance.

Description





Male dewlap moderate-sized; pinkish-red with cream dewlap scales. Some females have a rudimentary white dewlap; others lack a dewlap and have only a red spot on the throat.

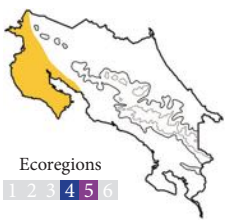
Similar species

- *Anolis alocomyos* (p. 151) cannot be reliably told apart from *Anolis tropidolepis* in the field.
- *Anolis leditzigorum* (p. 191) cannot be reliably told apart from *Anolis tropidolepis* in the field.
- *Anolis pachypus* (p. 208) has mostly smooth ventral scales; males have a red-orange dewlap with a large yellow central spot.
- *Anolis laeviventris* (p. 188) has heterogeneous flank scales that have enlarged tubercles mixed in; males have a white dewlap and a nuchal crest.
- *Anolis humilis* (p. 179) has a middorsal row of greatly enlarged scales; male dewlap bright orange-red with a yellow margin.

Anolis unilobatus
Dry Forest Anole

Least concern

A small anole with conspicuously short legs. Dull gray or brown, with a unique silky sheen on its scales and 6–8 greatly enlarged, heavily keeled middorsal scale rows; both sexes have a distinct nuchal crest. Male dewlap yellow-orange, with a bold central blue spot; females sometimes have a rudimentary white dewlap. Standard length to 2.0 in (52 mm) in males, to 1.9 in (48 mm) in females; total length to 6.3 in (160 mm).



Anolis unilobatus is widely distributed along both slopes of Central America, from Central Mexico southward to northwestern Costa Rica; it is absent on the Pacific slope of extreme southern Honduras, El Salvador, and northwestern Nicaragua (an area now occupied by *Anolis sericeus*). From near sea level to approximately 3935 ft (1200 m).

Natural history

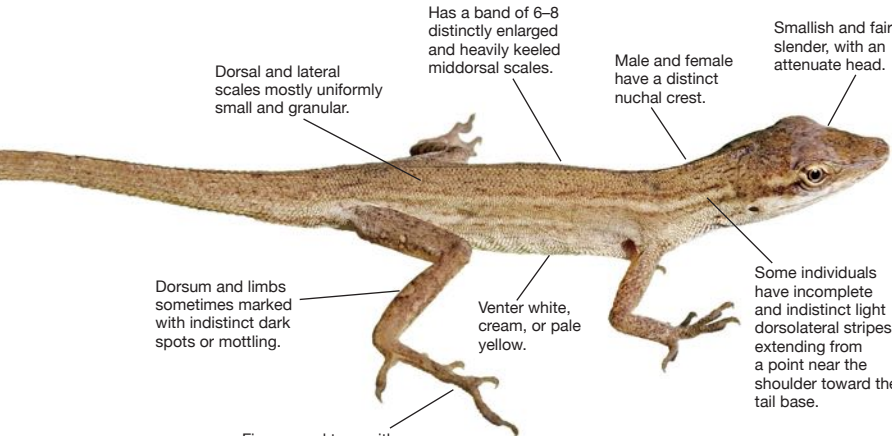
This is a species of dry lowland habitats that also ranges locally into humid foothills. *Anolis unilobatus* is very tolerant of a wide range of habitats and environmental conditions. It mostly inhabits sun-exposed, open areas, and is usually replaced by *Anolis cupreus* in more shaded forest interior habitats.

Anolis unilobatus is commonly seen on trees and fence posts along roadsides. If approached, it usually presses its body against the surface of its perch and scurries around the back of the trunk or post, to the side opposite the observer. It also frequents herbaceous ground cover, and is often seen in the morning climbing up and out of the vegetation at the base of a tree or fence post to bask.

Reproduction in *Anolis unilobatus* may occur year-round in more humid areas, but in areas with a pronounced dry season breeding activity may pause temporarily during the driest months.

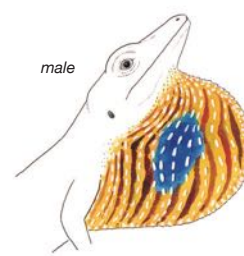
Costa Rican individuals of this species were previously included in *Anolis sericeus*, but that species is now restricted to northern Central America and differs in details of its hemipenis and dewlap morphology.

Description



Ventral scales large, heavily keeled, and often pointed; ventral scales much larger than the largest dorsal scales.

Anolis unilobatus is a relatively nondescript anole without a distinctive color pattern. Its dorsum is generally dull uniform gray to brownish-bronze, but its scales have a distinctive silky sheen.



Male dewlap is of moderate size; yellow to orange with a bold indigo-blue central round spot and white dewlap scales. Females sometimes have a very small, rudimentary white dewlap.

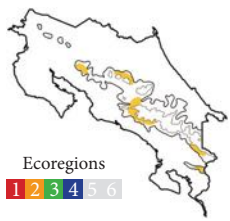
Similar species

- *Anolis cupreus* (p. 171) has a very large dewlap with shades of pink and orange.

Anolis woodi
Blue-eyed Anole

Least concern

A medium-sized to large arboreal anole with long limbs. Has bright blue eyes. Males with a low nuchal crest. Variable in color, ranging from bright green, brown, olive, to reddish-brown, and changes color rapidly. Dewlap color also variable; male dewlap moderate in size, olive green with or without a red or orange wash, and with light-colored scales. Females have a tiny dewlap. Standard length to 3.7 in (95 mm) in males, and 3.4 in (86 mm) in females; total length to 13.6 in (345 mm).



Anolis woodi is found in isolated populations throughout the Tilarán, Central, and Talamanca mountain ranges of Costa Rica, and ranges into western Panama; 3775–6560 ft (1150–2000 m).

Natural history

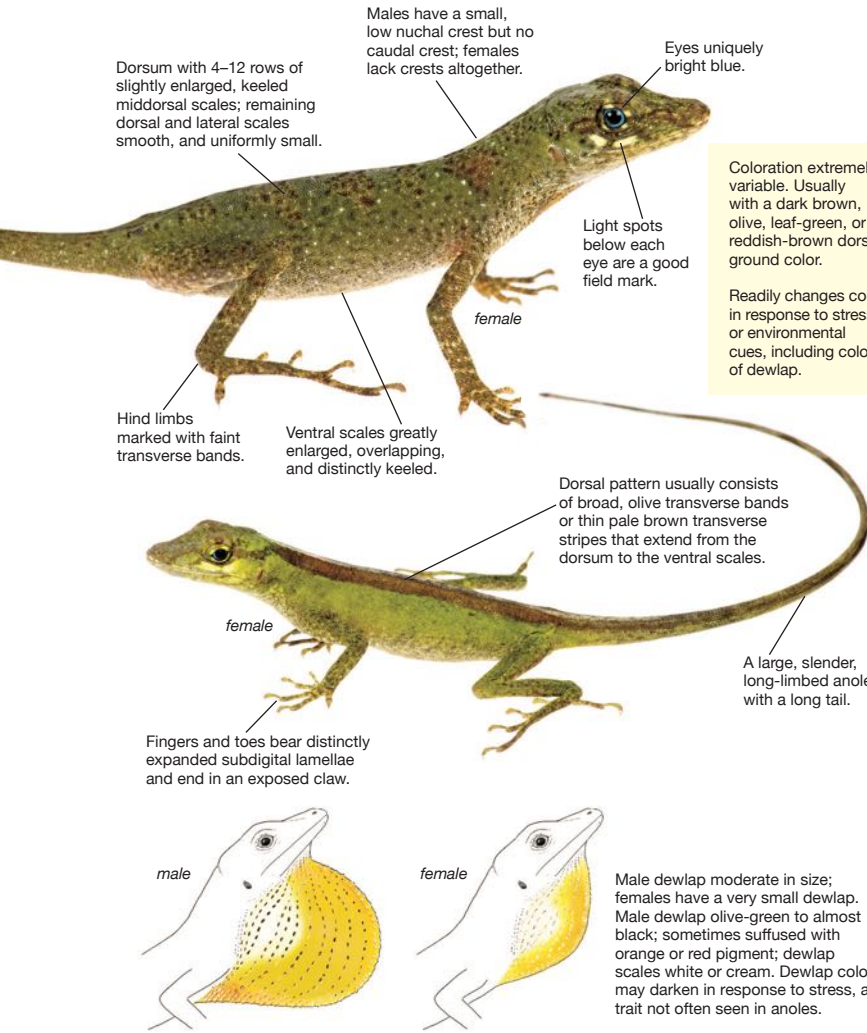
Anolis woodi is a common diurnal, arboreal species that is most frequently seen perched on tree trunks, sometimes at a considerable height. In forested habitats, it prefers edge situations, along trails or clearings, but it also occurs in moderately disturbed habitats as long as sufficiently large trees are present. At night, these lizards sleep exposed on branches and fern fronds at heights of 10–15 ft (3–5 m) above the ground.

Individual *Anolis woodi* can change their color and markings quite dramatically depending on mood, temperature, or substrate; within minutes, an individual may change from uniform bright green to reddish-brown or nearly black, with or without dark bands, stripes, or spots. Because of this ability to enhance its crypsis, *Anolis woodi* tends to rely on camouflage to escape detection, and it rarely runs when detected. More likely, individuals will freeze in place first, and may slowly move sideways to the side of their perch, usually a tree trunk, away from the observer.

Interestingly, the dewlap in *Anolis woodi* can also change color significantly. Generally, dewlap size and color are important keys for identifying anoles—and for allowing communication within anole species. Although in some species the dewlap scales may darken when an animal is stressed or excited, the color of the skin between these scales—which determines the actual dewlap color—usually does not change. It is not known how—or if—this ability affects interactions between individual *Anolis woodi* in a population.

This species lays eggs and apparently breeds year-round.

Description



Coloration extremely variable. Usually with a dark brown, olive, leaf-green, or reddish-brown dorsal ground color.

Readily changes color in response to stress or environmental cues, including color of dewlap.

Male dewlap moderate in size; females have a very small dewlap. Male dewlap olive-green to almost black; sometimes suffused with orange or red pigment; dewlap scales white or cream. Dewlap color may darken in response to stress, a trait not often seen in anoles.

Similar species

- *Anolis capito* (p. 161) has a distinctive, short-snouted head, lacks blue eyes, and has a small greenish dewlap.
- *Anolis biporcatus* (p. 159) has very short limbs, lacks blue eyes, and has a pale blue dewlap marked with red.
- *Anolis frenatus* (p. 175) has an oblique series of dark oval spots on its flanks, lacks blue eyes, and has a white dewlap.
- *Polychrus gutturosus* (p. 246) has an exceedingly long tail and its eyes are distinctively cone-shaped.

Family Iguanidae
(Iguanas)

Members of the family Iguanidae are among the largest, prehistoric-looking lizards. They have powerful limbs and a long tail. All species have comblike, spiky crests on the head, back, and tail and/or whorls of spines surrounding the tail.

In spite of their often intimidating appearance, iguanids are harmless creatures when left undisturbed. Some species are strictly vegetarian, while others consume varying quantities of plant and animal food throughout their lives.

In Costa Rica, there are three species in two genera, *Iguana* (one species) and *Ctenosaura* (two species).

Ctenosaura quinquecarinata

Critically endangered

Dwarf Spiny-tailed Iguana (*Garrobo Enano*)

A medium-sized, robust lizard with a prominently spiny tail. Typically, the tail base is flattened and distinctly wider than its posterior half. Standard length to 7.7 in (195 mm) and total length to 18.7 in (475 mm) in males; females smaller, with standard length to 6.1 in (154 mm) and total length to 12.6 in (320 mm).

Ctenosaura quinquecarinata occurs in isolated populations throughout the dry forest regions of central Nicaragua and northwestern Costa Rica; from near sea level to 820 ft (250 m).

Natural history

Ctenosaura quinquecarinata occurs primarily in semi-arid dry forest habitat and arid scrub savannas, preferably in steeply sloping terrain with many potential hiding places. This secretive, shy species excavates and inhabits burrows beneath large boulders or tree roots or hides in hollow tree stumps and branches. Individuals are rarely found far from the entrance of their burrow. They are usually seen when basking, exposed on a branch or rock during the hottest time of the day; they retreat into their burrow at the least sign of disturbance.

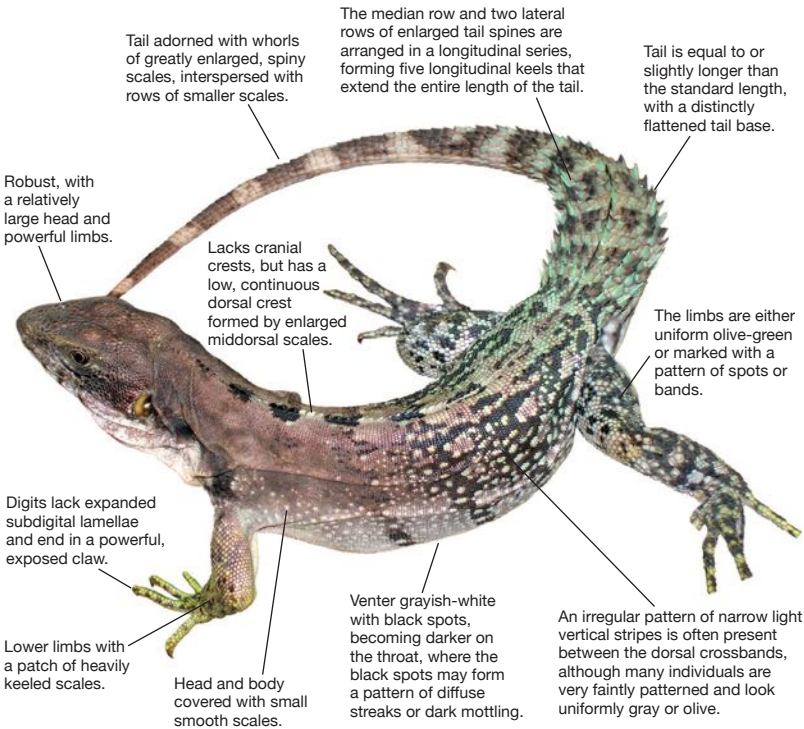
Adult *Ctenosaura quinquecarinata* occasionally feed on invertebrates but are predominantly vegetarian; examination of the stomach contents revealed mainly fruits and leaves. This species is oviparous.

Ctenosaura quinquecarinata is rare within its limited distribution range in Costa Rica. Its range is now quite fragmented due to habitat loss caused mostly by agriculture and cattle ranching. Populations are small, widely scattered, and often genetically isolated.

Besides pressure from habitat loss and fragmentation, this species is also collected for the international pet trade and hunted for its meat in parts of its range. *Ctenosaura quinquecarinata* is likely one of the rarest reptiles in the country and it requires effective conservation measures to ensure its long-term survival.

These skittish lizards are usually seen when they bask on branches or tree trunks.

Description



Ctenosaura quinquecarinata has a robust head, but lacks cranial crests.

Adults usually olive-green to gray, with a pattern of irregular dark transverse bands on the dorsum.

Juveniles are bright green with dark transverse bands.

Similar species

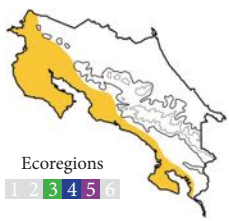
- Only *Ctenosaura similis* (p. 233) has a comparably spiny tail, but it is not distinctly flattened at its base and the tail spines do not form five continuous keels; it is a far more common and much larger species.
- *Sceloporus* species (pp. 239–244) are smaller and their spiny scales are not restricted to just the tail.

Ctenosaura similis

Common Spiny-tailed Iguana (*Garrobo*)

Least concern

A locally abundant iguana. Very large, with a distinct, serrated crest on the back, but no crest on the head. Its long, cylindrical tail bears whorls of distinctly enlarged and heavily keeled spiny scales that are separated by rows of small scales. Adult males massive, standard length to 19.2 in (489 mm) and total length to 51.2 in (1300 mm); females smaller and more slender, to 15.7 in (400 mm) in standard length and 31.5 in (800 mm) in total length.



Ctenosaura similis ranges continuously along the Pacific slope, from the Isthmus of Tehuantepec, Mexico, south to central Panama; it also occurs in several isolated populations along the Atlantic slope. From sea level to 4265 ft (1300 m).

Natural history

These large conspicuous lizards are a common sight along Costa Rica's Pacific coast. They bask on bright sunny days and can tolerate very high temperatures. Individuals can be seen along roadsides, perched on trees, rocks, or fence posts, and even on sun-exposed, blazing hot corrugated-iron roofs at midday; the optimum body temperature of active individuals hovers around 97–99 °F (36–37 °C). On overcast or rainy days, they stay inside their burrows, only to emerge once the skies clear up and the sun begins to shine.

Adults are mostly arboreal and are skillful climbers; large *Ctenosaura similis* are regularly seen perched high in large trees. Individuals often spend the night sleeping inside hollow branches. Juveniles are mostly active on the ground during the day, but sleep on exposed twigs and leaves in low vegetation.

The daily activities of individual *Ctenosaura similis* take place near a hiding place, often a burrow but sometimes a hollow branch or tree trunk. Burrows are usually excavated beneath rocks or logs and are 3–7 ft (~1–2 m) deep. Females excavate a different burrow prior to laying their eggs; these nest burrows are generally located in open, sunny areas and usually consist of a long winding tunnel, sometimes dozens of yards long, with several branches, dead ends, and chambers. Multiple females may use the same tunnel system, but each deposits her eggs in a separate chamber.

Female *Ctenosaura similis* lay eggs annually, starting at the end of their second year, when they reach sexual maturity. Clutch size increases with age and ranges from 12–88 eggs, although a typical number of eggs per clutch is reportedly 40–45. The eggs are laid at the end of the dry season and most juveniles emerge at the beginning of the rainy season, which coincides with a period of greater insect density. The bright green coloration of juveniles matches the young, new vegetation that springs up after the first heavy rains, and undoubtedly increases their chances of survival.

During the early rainy season, the population density of *Ctenosaura similis* may be very high. Juveniles are sometimes aggressive toward each other, but they do not evoke defensive behavior in adults. Adults, on the other hand, especially older males, are extremely territorial and vigorously stand their ground when defending their burrow and perches against intruders. If a potential competitor enters another male's territory, a ritualized defensive behavior follows. The resident male performs a head-bobbing display in which the head is jerked upward and lowered again in a bouncing motion. The intruder will answer this display by imitating the head-bobbing pattern of the first male. Normally, territorial disputes are settled solely by head-bobbing, but sometimes encounters end in fighting. Head-bobbing is widespread among iguanids, although each species uses slightly different routines and motions to communicate. Similar behavioral cues are deployed by males to attract females.

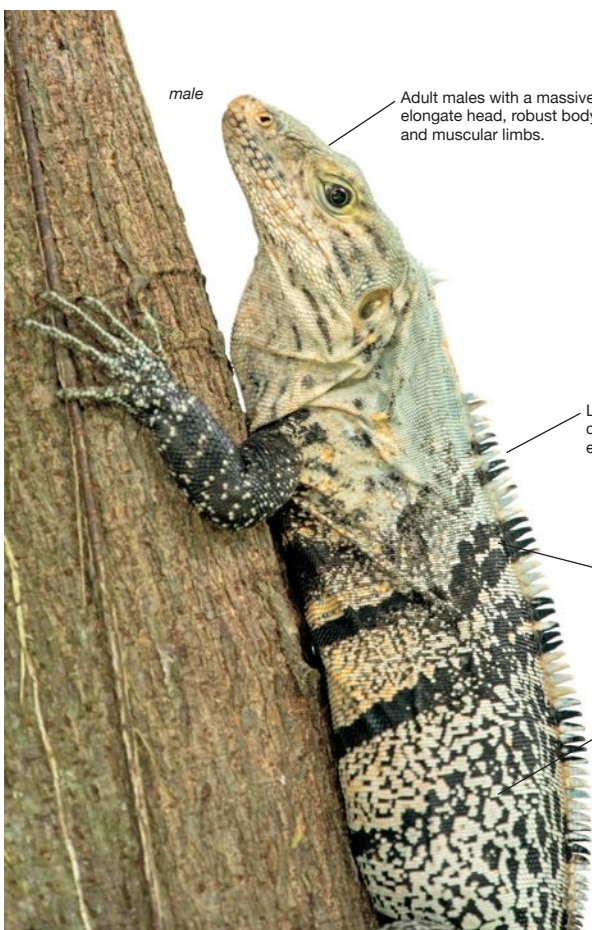
Ctenosaura similis is a true omnivore. Juveniles predominantly eat insects and other arthropods but

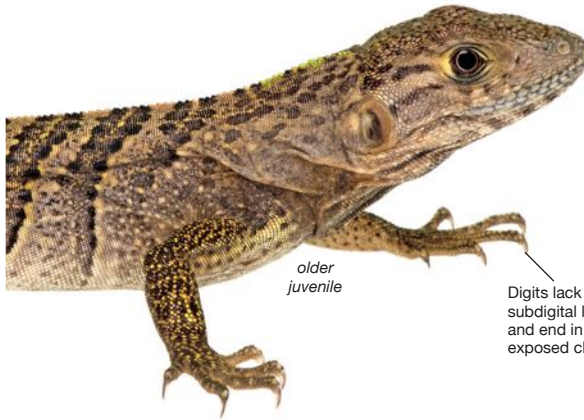
become increasingly vegetarian as they mature. The diet of large adults consists mainly of leaves, buds, and fruits. However, adults do occasionally eat relatively large vertebrate prey such as lizards, frogs, rodents, bird chicks and adult birds, eggs of other lizards, and even young members of their own species; one individual was even seen with a bat in its mouth.

Juveniles of this species have many predators and are eaten in large numbers by various species of snake (particularly *Trimorphodon quadruplex*), birds of prey, and some mammals. Larger adults are less susceptible to predation and effectively use their powerful jaws, claws, and sharply armored tail to defend themselves. Their eggs are often preyed upon by coyotes, raccoons, opossums, vultures, and a few snakes (especially *Loxocemus bicolor* but possibly also *Enulius flavitorques*).

Although the practice is not as common in Costa Rica, the meat of *Ctenosaura similis* is prized throughout much of Mesoamerica. Supposed medicinal properties ascribed to the meat of these animals also causes them to be heavily hunted in many areas. Nevertheless, this species remains quite common throughout its extensive range.

Description





Young juveniles are bright green, occasionally with faintly indicated dark transverse bands; they start changing into adult coloration after about six months to a year.

Large adult males have a huge head and a big dewlap.

Females are smaller and less robust than males, with a more slender head and a lower dorsal crest.

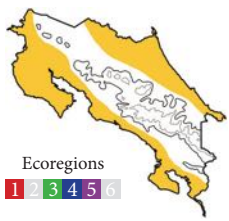
Similar species

- *Ctenosaura quinquecarinata* (p. 231) has whorls of spiny scales surrounding its tail but is much smaller and has a distinctly flattened tail base.
- *Iguana iguana* (p. 236) has a conspicuously enlarged circular scale on each side of the head, just below the ear, and has only a single, central row of enlarged pointed scales on its tail.

Iguana iguana
Green Iguana (*Iguana Verde*)

Least concern

A huge lizard. Note conspicuous crest of comblike spines down the neck, back, and tail, and the presence of a unique large circular scale on each side of the head below the ear opening. This is the largest lizard in Central America; adult males may exceed 78.7 in (2 meters) in total length, females are considerably smaller at 56.7 in (1.4 meters) in total length.



Iguana iguana ranges widely in Central and South America as well as on several Caribbean islands. It occurs from southern Mexico along both slopes to Brazil and Bolivia, from near sea level to 3280 ft (1000 m).

Natural history

Throughout its range, *Iguana iguana* is commonly seen in trees that line lowland rivers, but it also occurs inland at considerable distances from water. These diurnal lizards emerge when the sun is shining to bask on exposed branches. Adults are agile climbers that descend to the ground only to lay eggs or to move to a part of the forest that they cannot reach via the canopy. Their preferred perches are often on branches that overhang water, and large adult iguanas will readily dive into the water from great heights to escape danger. They sometimes hide on the bottom of the river and swim away when the coast is clear, using their long tail for propulsion.

Small juveniles of *Iguana iguana* spend most of their time on the ground, often forming large groups. They bask in the sun and hunt for insects and other invertebrates. As they get older, their diet becomes predominantly vegetarian. Like most herbivorous vertebrates, *Iguana iguana* is unable to digest plant matter, and the cellulose content of the plant matter in its diet is broken down by microorganisms that live symbiotically in its digestive tract. These microbes need a specific optimum temperature to function properly, but little is known about the temperature requirements or responses of microbe populations in reptiles, whose body temperatures fluctuate considerably depending on the ambient temperature. *Iguana iguana* appears to maintain a relatively constant body temperature of 97–99 °F (36–37 °C) during active daytime periods, when solar radiation is available. Experiments have shown that when an iguana's body temperature drops below this temperature, the efficiency of digestion decreases, with the result that more time is required for digestion than at the optimal temperature.

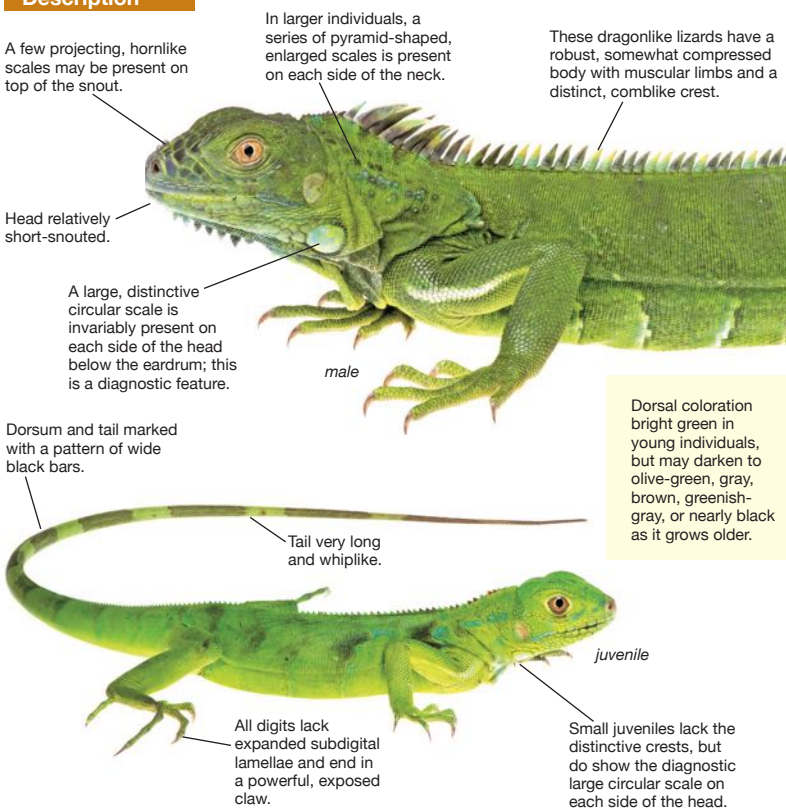
While the reproductive timing of this species changes according to its geographic provenance,

During the breeding season, the male's head is often marked with splashes of orange or yellow. In many populations, the spiny dorsal crest is tan or orange-brown. A large flap of skin with a serrated edge is located beneath the chin and throat; it is most prominent in adult males.

mating generally takes place in September, October, and November; gravid females start excavating a nest burrow during the dry season, just before the eggs are laid. Up to 70 eggs have been reported from a single clutch, but the number of eggs differs according to geographic location and likely also with the size of the female. Juveniles hatch about three months after eggs are laid, at the beginning of the rainy season, when prey availability is highest. Many animals prey on *Iguana* eggs, and a variety of larger mammals, snakes, and birds such as black vultures (*Coragyps atratus*) have been reported to raid nests. A recent report of several individuals of the small egg-eating snake *Enulius flavitorques* jointly slicing open an iguana egg and devouring its yolky contents illustrates a different method of predation.

In some places, *Iguana iguana* is heavily hunted for its meat. Locally, populations of these lizards living near human settlements are sometimes severely depleted. In many places in Central America, special breeding projects have been initiated to restock natural populations of green iguanas that have been seriously reduced and to supply the international pet trade with captive-bred offspring.

Description



Similar species

- *Ctenosaura similis* (p. 233) has whorls of spiny scales completely encircling the tail, and lacks the enlarged circular scale on the corner of the jaw.
- *Basiliscus plumifrons* (p. 139) has sail-like crests on the head, body, and tail.
- Juvenile *Iguana iguana* (p. 236) can be confused with other green lizards (e.g., juvenile *Ctenosaura similis, Anolis biporcatus,* and *Polychrus gutturosus*), all of which lack an enlarged, circular scale below the ear.

Family Phrynosomatidae
(Spiny Lizards)

This small family of lizards was formerly included as a subfamily in the family Iguanidae. Although the taxonomic position of the spiny lizards, and other related iguanids, has seen several changes recently, its members are quite recognizable as a group.

The family Phrynosomatidae ranges from southern Canada through much of the United States and Mexico to extreme western Panama. While 9 genera and about 155 species are included in this family, only a single genus, *Sceloporus*, with 3 species, occurs in Costa Rica. All are robust, broad-headed, short-snouted lizards with a short tail and distinctly spine-tipped scales covering the body, tail, limbs, and much of the head.

Sceloporus malachiticus

Green Spiny Lizard (*Lagartija Espinosa Verde*)

Least concern

A medium-sized, spiky lizard with a robust body; blunt, short-snouted head; relatively short tail; and extremely heavily keeled, spine-tipped scales. Adult males are typically brilliant green, with a distinct black collar; females and juveniles are mottled brown. Standard length to 3.9 in (98 mm) in adult males, total length to 7.5 in (190 mm); females only slightly smaller.

Sceloporus malachiticus occurs in the highlands, from northern El Salvador, Honduras, Nicaragua, and central Costa Rica to extreme western Panama; 1970–12,465 ft (600–3800 m).

Natural history

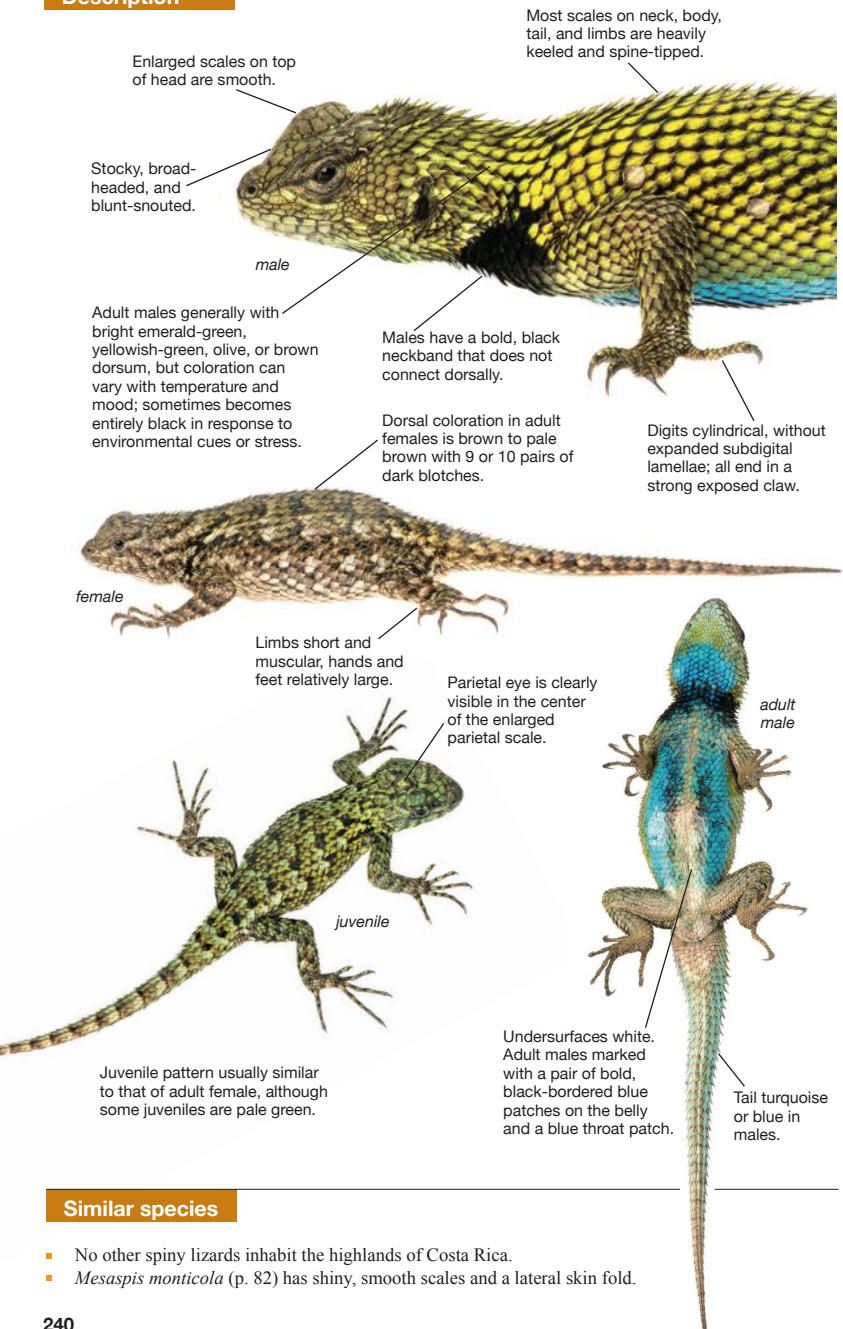
Sceloporus malachiticus is a common, conspicuous lizard that inhabits many types of open habitats in the Costa Rican highlands. It is particularly common on trees, logs, and fence posts in high elevation pastures; it also occurs in towns and cities, including downtown San José, where it persists in parks and gardens. This species basks frequently. Individuals are regularly seen sitting in sun-exposed spots for prolonged periods of time, especially at high altitudes where the climate is cool and humid. Often, individuals emerge from their nighttime retreat once the sun has risen and climb to a suitable elevated basking site. Ideal basking sites not only provide sun exposure, but also afford a good view of the surrounding area. *Sceloporus malachiticus* is very wary and it is not easy to approach once the lizard has had a chance to warm up; at the first sign of disturbance, it will dash into a crevice or tree hole, or disappear into a burrow below a log or rock, only to re-emerge cautiously after a short time. From their elevated vantage point, these lizards scan the area for suitable insect prey, and catch it with a quick sprint.

Individual *Sceloporus malachiticus* tend to be more arboreal towards the lower elevations of their distribution range and become gradually more terrestrial with increasing elevation. Juveniles also tend to be more terrestrial than adults. At the highest elevation sites within its range, individuals generally select dark-colored rocks, fallen logs, and stumps of dead trees as basking sites, as these objects warm up quickly and retain heat for a long time. Highland populations also tend to have a darker dorsal coloration to maximize heat absorption.

Sceloporus malachiticus is live-bearing; breeding apparently takes place year-round at high elevations, but appears to be more seasonal at lower elevations, where most babies are born late in the dry season. Litter sizes in this species range from 6–12 young. Gravid females tend to bask for a long time, as they incubate the developing embryos inside their body; highly gravid females can be so big that they have difficulty running or climbing quickly and they are very susceptible to predation during this period.

Lizards in the genus *Sceloporus* have a clearly discernible parietal eye, a photosensitive structure on the top of the head that, in conjunction with the pineal gland, aids in controlling thermoregulation and in supporting spatial orientation as these lizards navigate their home range.

Description



Similar species

- No other spiny lizards inhabit the highlands of Costa Rica.
- *Mesaspis monticola* (p. 82) has shiny, smooth scales and a lateral skin fold.

Sceloporus squamosus

Endangered

Dwarf Spiny Lizard (*Lagartija Espinosa Enana*)

A smallish, short-tailed lizard with extremely rugose, enlarged scales on the top of its head; usually has a tan, reddish-brown, or copper-colored head and a middorsal band. Lacks brightly colored ventral patches. Standard length to 2.2 in (57 mm); total length to 6.8 in (170 mm).

Sceloporus squamosus primarily inhabits dry forest areas in the Pacific lowlands, from Chiapas, Mexico, south to northwestern Costa Rica; it also occurs in a few isolated valleys on the Atlantic slope of Honduras and Guatemala. From near sea level to at least 1150 ft (350 m).

Natural history

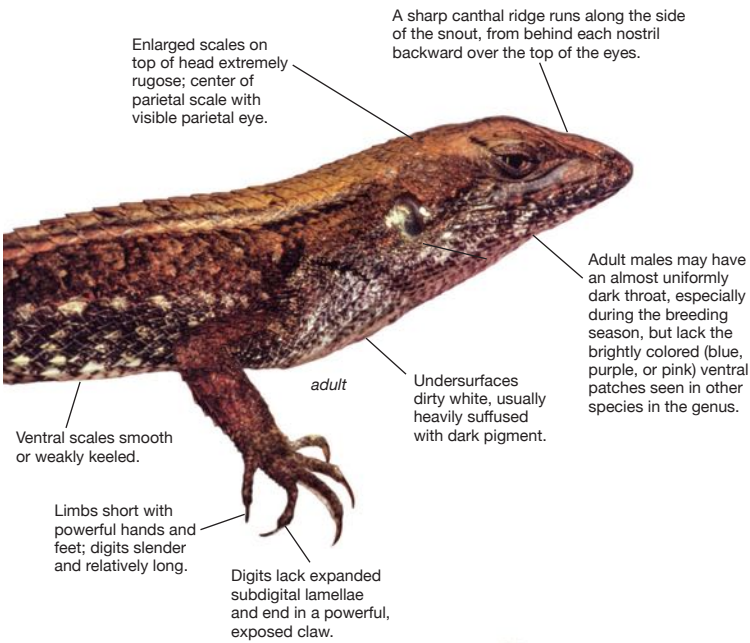
Sceloporus squamosus is smaller and more slender than the two other Costa Rican *Sceloporus* species. It is mainly found in very hot, dry, open areas in the northern Pacific lowlands. This lizard is mostly terrestrial and inhabits places with isolated patches of herbaceous ground cover; the vegetated edges of dirt roads or farm fields are good places to look for it. It also persists in other disturbed habitats such as coffee plantations and other agricultural areas with relatively low vegetation density. Individuals are most frequently seen dashing from cover to cover while foraging for insect prey. This species is oviparous. In El Salvador, many juveniles were present from November to February, suggesting a peak in hatching towards the end of the rainy season.

Description

A predominantly brown to reddish-brown lizard with a broad tan, copper, or reddish-brown dorsal field; uniformly colored in juveniles, marked with indistinct dark V-shaped blotches in adults.

Finely keeled, spine-tipped scales cover dorsum, limbs, and tail; scales on flanks smaller in size than those on dorsum.

Postfemoral pocket absent.



Similar species

- *Sceloporus variabilis* generally has a pattern of light dorsolateral stripes and paired dorsal spots, not chevron-shaped markings on a copper dorsum.

Sceloporus variabilis

Least concern

Rose-bellied Spiny Lizard (*Lagartija Espinosa Panza Rosada*)

A medium-sized, robust spiny lizard; brown, with a pattern of dorsolateral light stripes and a series of paired dorsal spots. Venter white, with pink and blue patches. Standard length to 3.0 in (75 mm) in males and 2.7 in (68 mm) in females; total length to 6.9 in (175 mm).

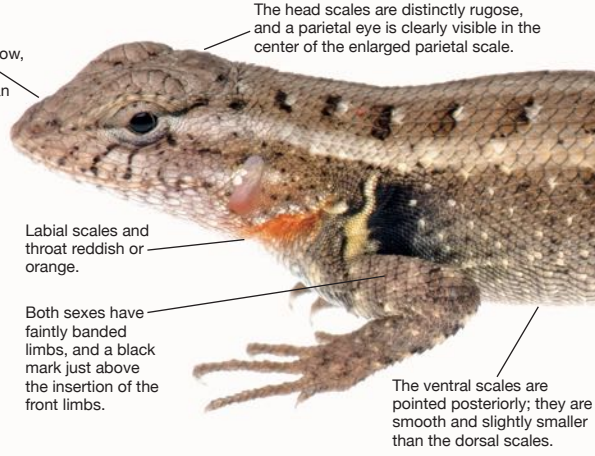
Sceloporus variabilis has a large distribution range that extends along the Atlantic slope from the southern US to northeastern Nicaragua, and along the Pacific slope from Oaxaca, Mexico (absent from the Yucatán Peninsula), to northwestern Costa Rica. From near sea level to 2625 ft (800 m).

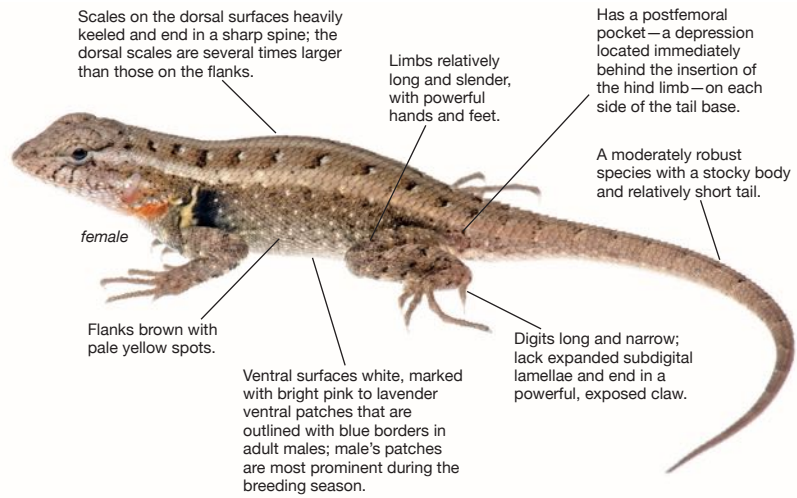
Natural history

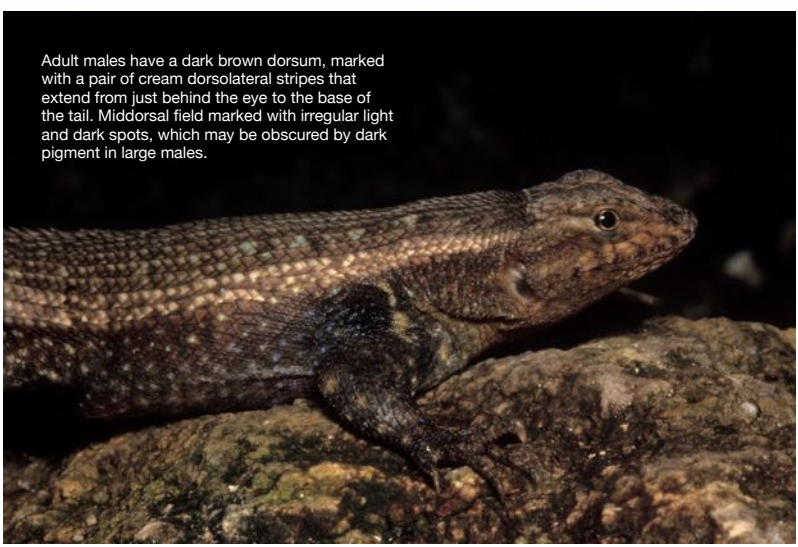
Sceloporus variabilis can be very common locally, especially in arid lowland regions. This is a terrestrial species that occasionally climbs to bask on elevated perches such as rocks, tree trunks, and fence posts. It is also commonly seen among the driftwood and debris near the high tide line of sandy beaches. When approached, an individual will initially attempt to hide by moving to the opposite side of its perch; if this proves unsuccessful, it will run for several yards in a quick dash and attempt to hide under surface debris or in dense vegetation. Individuals are often seen actively chasing invertebrate prey.

Males are highly territorial and put on elaborate head-bobbing and push-up displays to deter intruders from entering their territory. Similar ritualized display behaviors are used during courtship to impress a female; these behaviors are reinforced by showing off the male's flashy, brightly colored ventral patches. Females can produce multiple clutches of 1–5 eggs during the prolonged breeding season. Eggs are deposited virtually year-round, but breeding activity increases during the rainy season.

Description







Similar species

- *Sceloporus squamosus* (p. 241) is smaller, has a reddish-brown head, and lacks brightly colored ventral patches. It generally has a pattern of chevron-shaped markings on a copper dorsum, not a series of paired dark spots.

Family Polychrotidae
(Bush Anoles)

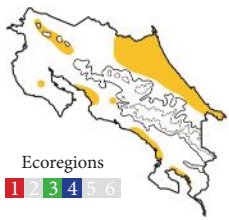
This small family of predominantly South American canopy lizards currently contains eight species in a single genus; one species occurs in Costa Rica. Until recently, the family Polychrotidae also contained hundreds of species of anoles, which are now placed in their own family, Dactyloidae. Repeated revisions of these, and related, families of iguanid lizards have led to regular changes in taxonomy and nomenclature.

These are slender arboreal lizards with chameleon-like, cone-shaped eyes that can move independently of one another. Their tail is extremely long and attenuate; it is used for balance and stabilization during arboreal acrobatics. Lizards in this family are slow-moving and rely on their camouflage to escape detection. When spotted, they often freeze in mid-stride and remain motionless for long periods of time, sometimes in awkward, unnatural-looking positions.

Polychrus gutturosus
Canopy Lizard (*Cameleón*)

Least concern

Slender, with long legs and an extremely long tail (may be more than three times the standard length). Head pointed, with unique, cone-shaped eyes that can move independently of one another. Standard length to 6.7 in (170 mm) in females, 5.3 in (135 mm) in males; total length to 27.5 in (700 mm).



Polychrus gutturosus occurs in isolated populations, from northeastern Honduras on the Atlantic slope, and central Costa Rica on the Pacific slope, south to northwestern Ecuador. From near sea level to at least 2560 ft (780 m).

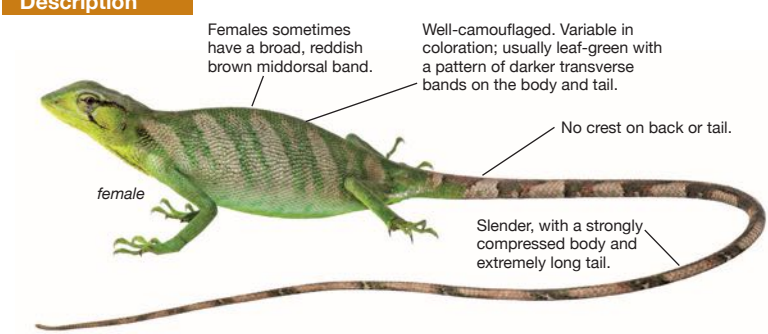
Natural history

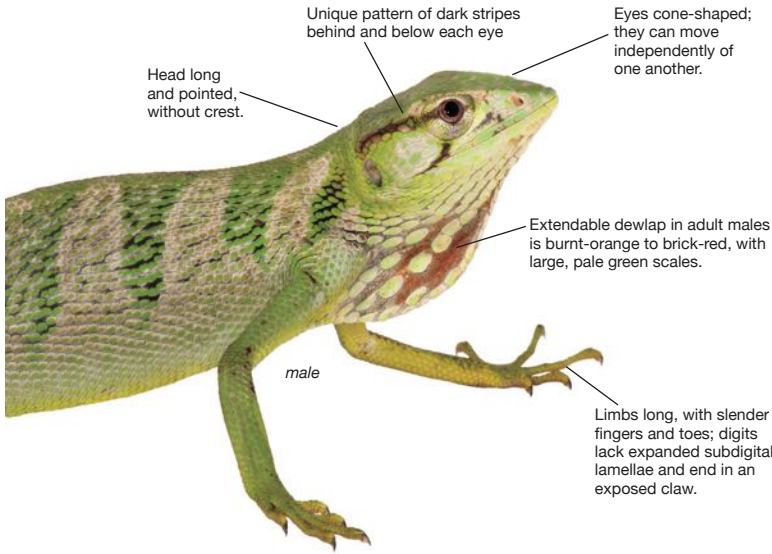
Polychrus gutturosus is a slow-moving, completely arboreal lizard. It is usually found at night, when it has selected a sleeping spot in low shrubs or trees. During the day, it is generally active in the tops of trees, including in the crowns of emergent canopy trees more than 115 ft (35 m) above the forest floor. Most individuals of this infrequently seen species have been found in edge situations in densely forested areas, either in vegetation at the edge of a clearing or on the very outside of the crowns of canopy trees. Nonetheless, one individual was found in an ornamental hedge within a highly landscaped resort on the Pacific coast. It is possible that this individual was released in the area, or perhaps *Polychrus gutturosus* is more tolerant of habitat alteration than is currently thought. Due to its secretive behavior and excellent camouflage, this species is difficult to detect and likely underreported.

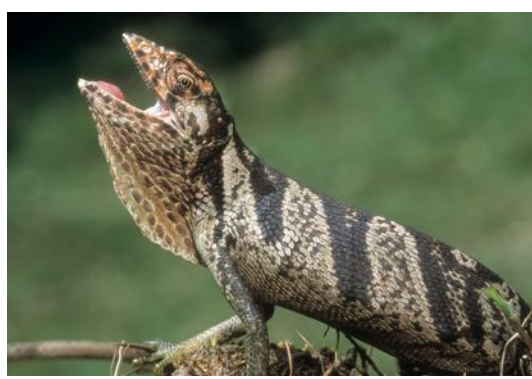
Polychrus gutturosus is capable of considerable color change and can match its coloration with that of its backdrop. Behavioral traits further camouflage this species, and individuals mask their presence by superimposing a rocking motion on their forward movement to mimic wind-blown vegetation. When threatened, these lizards defend themselves fiercely; they gape at the source of the threat, flatten out their body and posture to appear larger, and can inflict a painful bite if pushed too far.

Polychrus gutturosus is omnivorous; it is known to eat insects as well as leaves, fruits, and seeds. The main predators of these lizards are likely arboreal snakes and birds of prey such as the American swallow-tailed kite (*Elanoides forficatus*), which has been observed plucking individuals from their arboreal perch.

Description







Can rapidly change its coloration in response to changes in its emotional state, or due to environmental factors. Under duress, it usually becomes nearly uniformly dark, from dark olive to brown.

Similar species

- No other Costa Rican lizard has cone-shaped eyes.
- *Corytophanes cristatus* (p. 244) and *Basiliscus* species have a bony crest on the head.
- *Iguana* species and *Ctenosaura* species have spiny, serrated crests on the head and body.
- *Anolis* species are most similar but smaller, with expanded lamellae under each digit.

Infraorder Scincomorpha
(Families Gymnophthalmidae, Scincidae, Teiiidae, and Xantusiidae)

The infraorder Scincomorpha contains an enormous variety of lizards that are found worldwide. Although they can appear quite different in overall appearance, they all share a number of minute features, including skeletal morphology and dental structure. This infraorder includes all skinks, the largest lizard family (it comprises nearly 25% of the world's lizard species), as well as Old World lacertid lizards (family Lacertidae), girdled lizards (family Cordylidae), plated lizards (family Gerrhosauridae), and night lizards (family Xantusiidae). The macro-teiids (family Teiiidae) and micro-teiids (family Gymnophthalmidae) are currently also included in this infraorder, but that decision is still under debate.

The majority of species in Scincomorpha occur in the Old World. And, while skinks (family Scincidae) tend to be the most diverse group of lizards in many parts of the world, relatively few species inhabit Latin America. The families Gymnophthalmidae, Teiiidae, and Xantusiidae, however, are restricted to the New World. The infraorder Scincomorpha is represented in Costa Rica by 19 species of lizard, placed in these 4 very distinctive families.

Infraorder Scincomorpha at a Glance

- **Family Scincidae (p. 250)**. Small to medium-sized lizards. They are shiny, with smooth scales, and have a cylindrical body and tail; their small head is scarcely wider than the neck. The head is covered with enlarged, symmetrical, smooth plates. All members of this family have moveable eyelids and a visible external ear opening. Limbs are relatively short; each ends in five slender digits and an exposed terminal claw.

- **Family Gymnophthalmidae (p. 262)**. A very diverse group of small lizards. All have squarish plates on the venter; enlarged, symmetrical plates on the head; and square or rounded scales (never small, granular scales) on the rest of the body and tail.

- **Family Teiidae (p. 275)**. Small to medium-sized. These fast, streamlined lizards have a pointed snout, powerful limbs, and a

very long tail. Venter is covered with squarish plates, head with enlarged symmetrical plates, and upper surfaces of body with minute granular scales.

- **Family Xantusiidae (p. 289)**. Medium-sized, large-headed lizards that lack moveable eyelids. Head is armored with large, symmetrical plates; venter has square scales; body and tail are covered with minute granular scales, interspersed with enlarged, pointed tubercles.

Family Scincidae
(Skinks)

In many parts of the world, skinks are the most abundant lizard species. Indeed, the great diversity of this group (more than 1600 species worldwide) attests to its success. In Central America, however, the situation is different. Only 5 of Costa Rica's 88 lizard species are in the family Scincidae.

Skinks have an elongate, cylindrical body, robust medium-length tail, and a conical head. In Costa Rican species, the small but powerful limbs bear 5 digits. Skinks typically have several rows of uniform, cycloid scales that completely encircle the body, and enlarged plates covering the head. The scales on the body are smooth and often very shiny.

Several recent attempts have been made to clarify the phylogenetic relations between the various groups that make up this large, diverse, and geographically widespread family. The 5 species of Costa Rican skink are currently assigned to 3 subfamilies, and some authors have even elevated each of these subfamilies to full family status. As future research is likely to result in additional taxonomic changes, the author prefers to keep the few Costa Rican species within the family Scincidae. In addition, because species are moved from group to group on the basis of traits that are impossible to note in the field (e.g., differences at the molecular level and minute differences in skull morphology), these traits are not included in the species accounts. Nevertheless, the 3 subdivisions relevant to Costa Rican skinks are presented in the following pages.

Subfamily Mabuyinae (Sun Skinks)

This highly successful group of skinks occurs worldwide in a wide variety of habitats and climates. More than 200 species are included in this group, which some authors grant full family status. Three species in the genus *Marisora* occur in Costa Rica. They were formerly included in the large genus *Mabuya*, an assemblage of medium-sized skinks distributed throughout the world's tropical and subtropical regions. In a recent taxonomic reclassification, 7 species were placed in the genus *Marisora*, which is now restricted to Central and northern South America, as well as several Caribbean Islands. Historically, Costa Rica was thought to be home to a single species (*Mabuya unimarginata*), and several unsuccessful attempts have been made to identify cryptic forms that were seemingly hidden within this variable species. During the recent taxonomic revision of this genus, 2 of these previously identified forms were elevated to full species status. Currently 3 species of *Marisora* are recognized in Costa Rica, each readily identified by the presence of a bold white lateral stripe on their bronze to brown body. Due to the difficulty of distinguishing the 3 species of *Marisora*, however, exact distribution ranges for each have yet to be established, and additional cryptic forms may still exist within the species described here.

Subfamily Scincinae (True Skinks)

Almost 300 species are currently included in this subfamily, but only a single species, *Mesoscincus managuae*, reaches northwestern Costa Rica. This is a relatively large, rare lizard that differs from other skinks in the region by having a row of distinctly widened middorsal scales, each at least twice the width of the neighboring scale rows.

Subfamily Sphenomorphinae (Forest Skinks)

Another large assemblage (currently 577 species) of relatively small woodland skinks. A single, wide-ranging species occurs commonly throughout much of the Costa Rican lowlands. Formerly known as *Sphenomorphus cherriei*, it was recently reassigned to the genus *Scincella*. *Scincella cherriei* is a small, smooth-scaled leaf litter skink with a characteristic single, large frontonasal shield on the top of its snout that separates the nasal scales.

Marisora alliacea
Costa Rican Four-lined Skink

Least concern

A medium-sized skink. Metallic-bronze to brown, with a distinct dark brown lateral band, bordered below by a white stripe and bordered above by a broad, diffuse tan or copper-colored dorsolateral stripe. Middorsal area has a series of irregular dark and light longitudinal stripes. Standard length to 3.5 in (88 mm), total length to 9.6 in (244 mm).

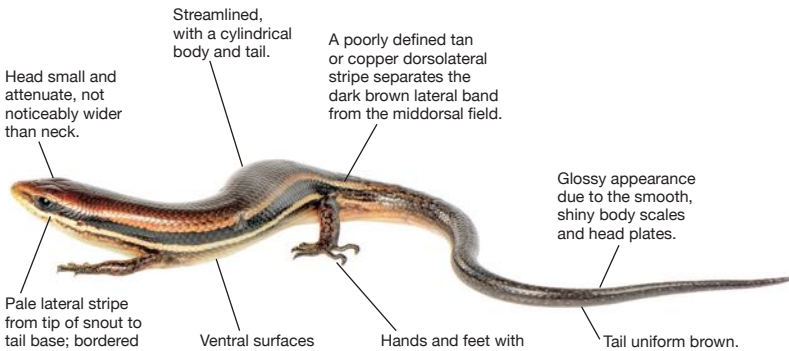
Marisora alliacea occurs throughout the Atlantic lowlands of Costa Rica and southeastern Nicaragua; from near sea level to at least 2000 ft (610 m).

Natural history

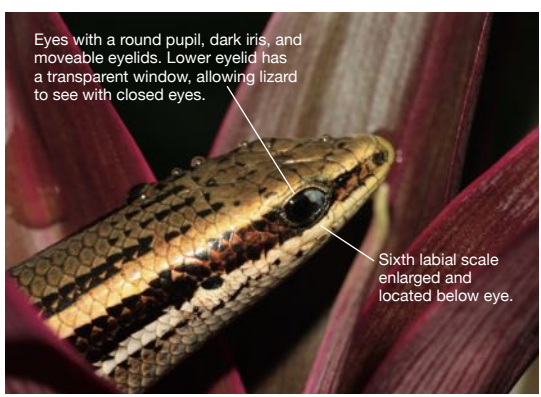
This common, widespread, and adaptable lizard is the only species of *Marisora* found on the Atlantic slope, where it occurs in a wide variety of habitats. It is a thermophilic ("heat loving") species usually found in open situations rather than in dense forest. It is often seen in secondary vegetation types, plantations, and even on trees lining major roads or on walls of buildings. *Marisora alliacea* is sometimes seen basking on the dried fronds that make up the trunks of coconut palms or climbing through the branches of dense shrubs; although it is predominantly a terrestrial species, these lizards are adept at climbing. Individuals are mostly seen moving rapidly through low herbaceous vegetation, or leaf litter, in search of insect prey. It often basks early in the morning with only part of the body exposed, protruding from a crevice or burrow. Foraging individuals regularly pause their activity to bask briefly in a sunny spot, thus maintaining an adequately high body temperature.

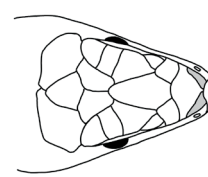
Mabuya alliaceae is ovoviviparous, and females may give birth to 4–7 young. Reproduction likely takes place nearly year-round; there usually is a pause during the driest months of the year in parts of its range with a pronounced dry season.

Description



26–28 scale rows at midbody (rarely 27 or 29).





Supranasal scales usually separated; frontonasal scale in direct contact with frontal scale.

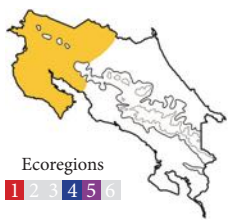
Similar species

- *Marisora brachypoda* (p. 254) has shorter limbs (do not overlap when adpressed), and its middorsal field is uniformly colored or marked with spots (not stripes).
- *Marisora unimarginata* (p. 256) has a uniformly colored or spotted middorsal field, not a pattern of dark and light longitudinal stripes.
- *Gymnophthalmus speciosus* (p. 267) lacks moveable eyelids and has only 4 digits on each forelimb.
- Other skinklike lizards (*Scincella cherriei, Mesoscincus managuae, Celestus* and *Diploglossus* species) lack a light-colored lateral stripe.

Marisora brachypoda
Short-legged Skink

Least concern

A medium-sized skink. Metallic bronze to brown, with a distinct white lateral stripe between the tip of the snout and the insertion of the hind limb, bordered above by a dark brown lateral band. Irregular dorsal markings formed by scattered dark-centered scales; does not have a pattern of dark and light longitudinal stripes. Limbs are short; they do not overlap when adpressed against side of the body. Standard length to 3.6 in (91 mm), total length to 10.0 in (255 mm).



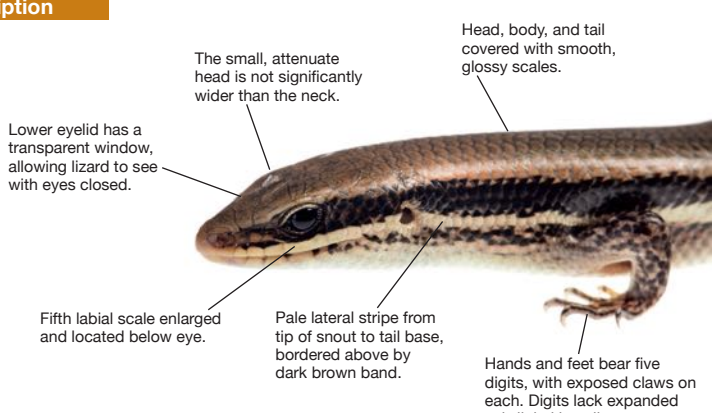
Marisora brachypoda ranges widely along the Atlantic and Pacific slopes of northern Central America, from Colima and Veracruz, Mexico, to northwestern Costa Rica. From near sea level to at least 1640 ft (500 m).

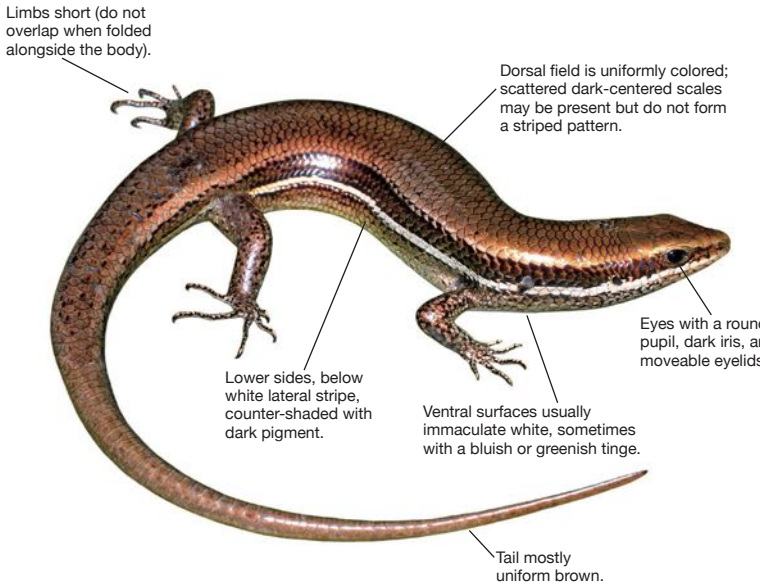
Natural history

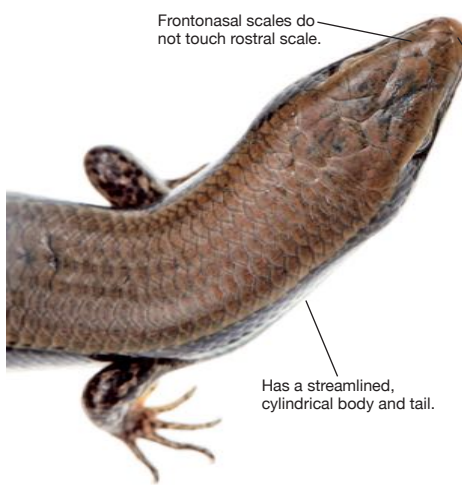
The Pacific slope is home to two species of *Marisora* whose exact distribution patterns are still poorly understood; they possibly overlap in parts of northwestern Costa Rica. Both are very similar in appearance and may be difficult to distinguish by a casual observer, especially since both forms show considerable variation in their color pattern and morphology. In addition, it is possible that other cryptic forms are hidden within what is now considered *Marisora brachypoda*, because some individuals from the Nicoya Peninsula do not match descriptions of currently recognized forms.

Like the other Costa Rican *Marisora* species, *Marisora brachypoda* can be locally common. It is an adaptable species that occurs in a variety of relatively hot, dry habitats, preferably areas with low herbaceous vegetation or a thick leaf litter layer and sun-exposed basking spots. Although predominantly terrestrial, these skinks are adept climbers and regularly scale trees or climb about in low bushes. They are only active during the day and are mostly seen when basking, or as they actively chase insect prey.

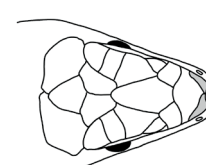
Description







30 scale rows at midbody (rarely 28 or 32).



Supranasal scales connect on midline, separating frontonasal scale from rostral scale.

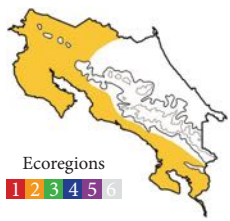
Similar species

- *Marisora alliacea* (p. 252) has longer limbs, tan dorsolateral stripes, and a pattern of longitudinal stripes in the middorsal field.
- *Marisora unimarginata* (p. 256) has longer limbs, and the 6th labial scale (not 5th) is in contact with the eye.
- *Gymnophthalmus speciosus* (p. 267) lacks moveable eyelids and has only four digits on each forelimb.
- Other skinklike lizards (*Scincella cherriei, Mesoscincus managuae, Celestus* and *Diploglossus* species) lack a light-colored lateral stripe.

Marisora unimarginata
Central American Skink

Least concern

A medium-sized skink; limbs relatively long. Metallic bronze to brown, with a distinct white lateral stripe and a dark brown lateral band above this stripe. Dorsum has irregular dark markings formed by scattered dark-centered scales; it never has dark and light longitudinal stripes. Standard length to 3.6 in (91 mm), total length to 10 in (255 mm).



Marisora unimarginata occurs on the Pacific slope of Costa Rica and Panama, from near sea level to 4925 ft (1500 m).

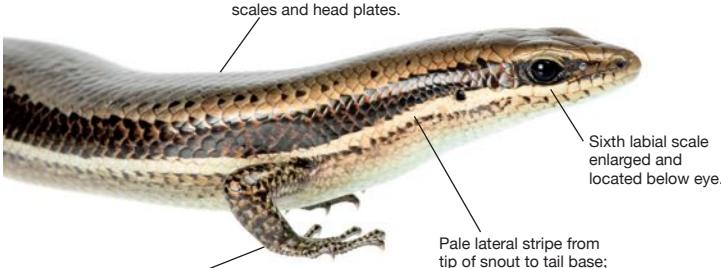
Natural history

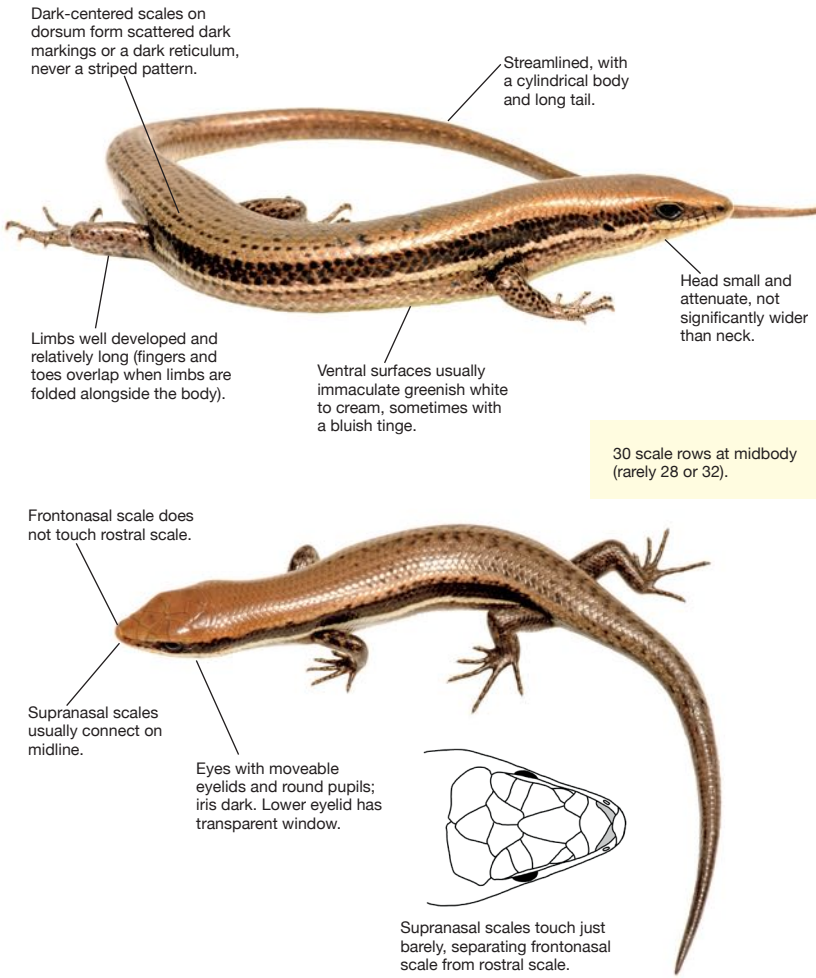
This common species is often found in disturbed habitats near human settlements, at the edges of forests, and in clearings within forested regions or plantations. While it is mainly terrestrial in forested areas with a leaf litter layer, it can be quite arboreal in open terrain. In gardens, parks, farms, and plantations, it is often seen scaling coconut palms and hiding in the leaf axils of old fronds; it also retreats into crevices in other types of living trees, in abandoned logs in pastures, or even in isolated fence posts.

Marisora unimarginata is strictly diurnal; it basks in the early morning before beginning to forage for small insects and spiders. Active individuals move rapidly through leaf litter or low, herbaceous vegetation in search of prey, and regularly pause in sun-exposed spots to maintain an adequately high body temperature. This species occurs at much higher elevations than the other Costa Rican *Marisora*, and its surface activity in highland locations is generally restricted to sunny days.

This species is ovoviviparous, and females may give birth to several young at a time. Reproduction can take place year-round, but often slows down during the driest months in those areas with a pronounced dry season; the reproductive season at higher elevations is likely centered on warmer, drier periods throughout the year.

Description





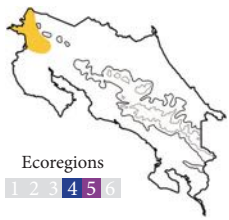
Similar species

- *Marisora alliacea* (p. 252) has indistinct tan dorsolateral stripes, and a pattern of longitudinal stripes in the middorsal field.
- *Marisora brachypoda* (p. 254) has shorter limbs, and the 5th labial scale (not the 6th) is in contact with the eye.
- *Gymnophthalmus speciosus* (p. 267) lacks moveable eyelids and has only four digits on each forelimb.
- Other skinklike lizards (*Scincella cherriei, Mesoscincus managuae, Celestus* and *Diploglossus* species) lack a light-colored lateral stripe.

Mesoscincus managuae
Managua Skink

Least concern

A relatively large, robust skink with short limbs. Has smooth, sleek scales. The only skink in the country with a row of distinctly enlarged middorsal scales that are at least twice the width of the neighboring scales. Standard length to 4.9 in (125 mm), total length to 11.1 in (282 mm).



Mesoscincus managuae occurs in isolated populations in the dry forests of the Pacific slope, from northern El Salvador to northwestern Costa Rica. It likely also occurs in southern Guatemala. Found near sea level to 2330 ft (710 m).

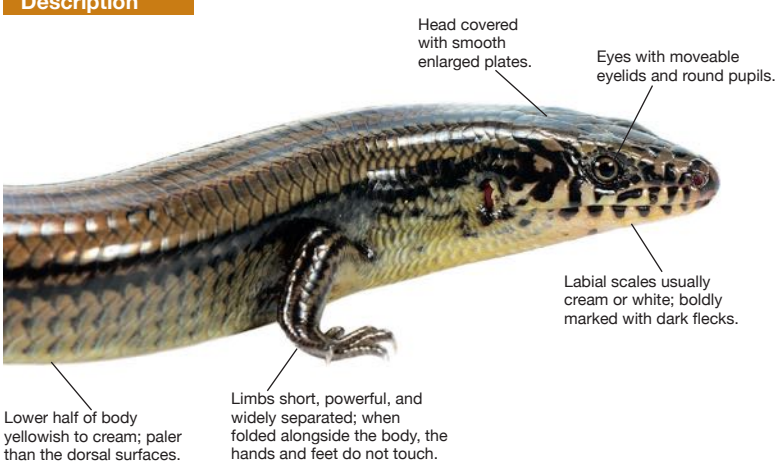
Natural history

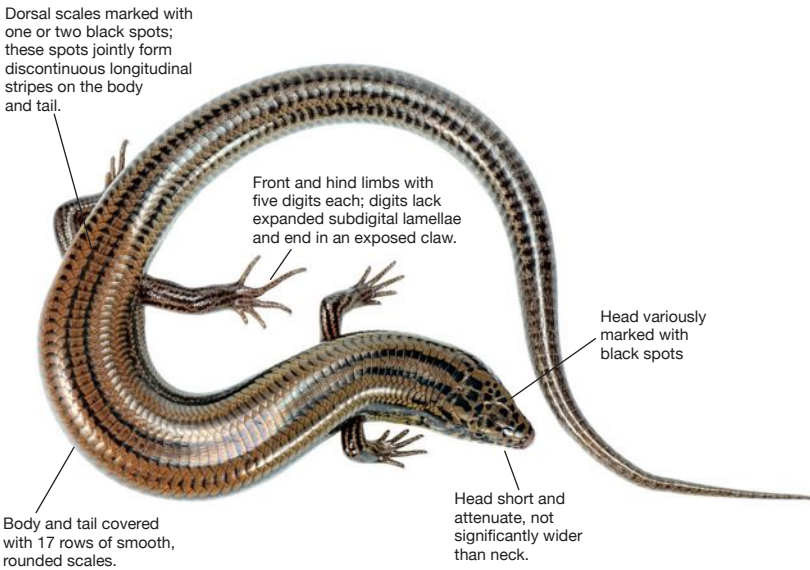
Not much is known about the biology of this shy, secretive lizard. *Mesoscincus managuae* is relatively rare, with only limited observations in Costa Rica. Most records are from lowland dry forest habitat, but this species may also reach into broadleaf evergreen forest in some foothill locations. It prefers relatively open habitat, usually with sparse vegetation and rocky outcrops; individuals have been found close to human settlements, and the dry open habitat it prefers is sometimes man-made. Given its tolerance for habitat alteration, and the ready availability of seemingly suitable habitat in northwestern Costa Rica, it is surprising that this lizard is not more frequently observed.

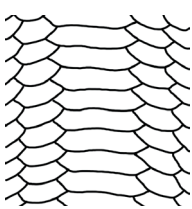
Mesoscincus managuae has been spotted under logs and rocks or basking at the entrance of burrows. It is not known whether these lizards excavate their own burrow, but one individual was discovered in the tunnels of an abandoned leaf-cutter ant nest. *Mesoscincus managuae* is probably oviparous.

Most older publications include *Mesoscincus managuae* as *Eumeces managuae*.

Description







Middorsal scale rows prominently enlarged, at least twice as wide as neighboring scale rows.

Similar species

- No other skinklike lizard has a greatly enlarged middorsal scale row.
- *Marisora* species (pp. 252–257) have a distinct, white lateral stripe.
- *Gymnophthalmus speciosus* (p. 267) is much smaller and lacks moveable eyelids.
- *Scincella cherriei* (p. 260) is much smaller and lacks a greatly enlarged middorsal scale row.

Scincella cherriei
Brown Forest Skink

Least concern

A small leaf-litter skink, with short, widely separated limbs. Head small with large eyes and moveable eyelids. Dorsum brown with a dark brown to black lateral stripe, but never a pale lateral stripe. All dorsal scales smooth and similar in size. Standard length to 2.3 in (58 mm) in males, 2.7 in (68 mm) in females; total length to 7.0 in (178 mm).

Scincella cherriei ranges continuously along the Atlantic slope, from Tabasco, Mexico, to western Panama; it also occurs locally on the Pacific slope in Costa Rica and Panama. An isolated population in the northern Yucatán Peninsula of Mexico may represent a separate species. From near sea level to 4265 ft (1300 m).

Natural history

This small skink is commonly found in open edge situations (along trails or clearings) in relatively wet forests. In the dry parts of northwestern Costa Rica, this species is restricted to gallery forests growing along streams. *Scincella cherriei* rarely basks in sun-exposed spots, and much of its activity occurs beneath the cover of the leaf litter; it is most often seen in brief glimpses as it darts in and out of the leaf litter layer.

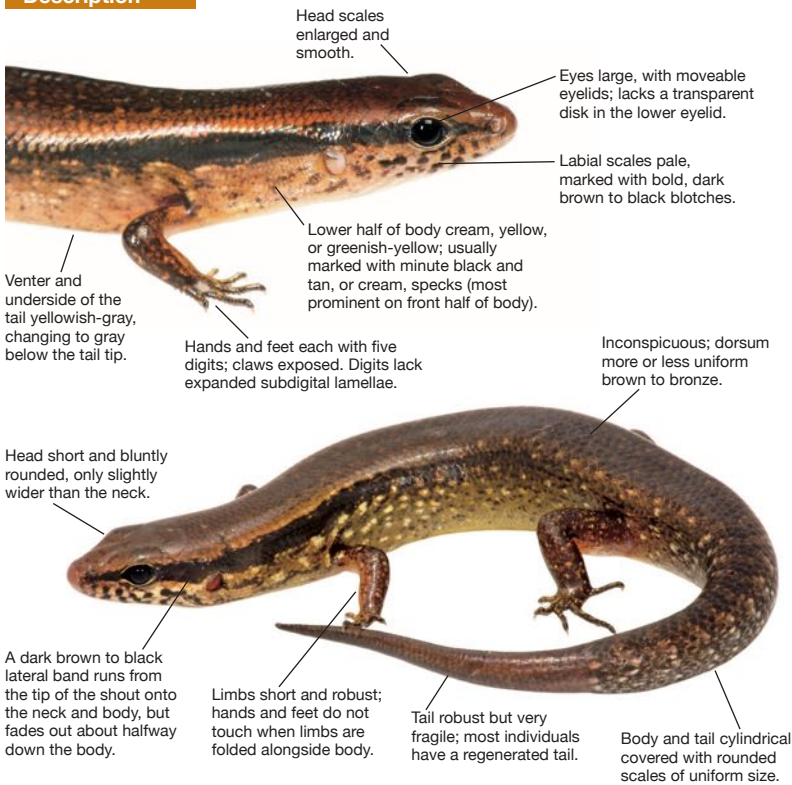
This species is an active forager of invertebrate prey that it locates using chemical cues. Prey is usually relatively large and consists of insect larvae, spiders, cockroaches, and other arthropods; it is also known to occasionally eat hatchlings of its own species. Most of its foraging activity occurs in the mid-morning hours, when the ambient temperature has reached about 77 °F (25 °C). During the midday heat, these lizards retreat into the shade, though they may resume foraging in mid-afternoon.

Scincella cherriei possesses osteoderms, which are small bony plates embedded in its scales that collectively form a strong armor against certain predators. Autotomy of the tail is very common in this species and most individuals have a regenerated tail. Even though the temporary loss of a tail does not threaten the lives of these animals, it does have implications for growth and development. The tail is used to store fat reserves that provide additional energy for reproduction; females who lose their tail may not be able to reproduce for a period of time because energy resources are needed to regrow the tail rather than develop embryos. *Scincella cherriei* also uses its tail for balance; running individuals sometimes avoid predators by flipping the entire body around 90º, using the heavy tail for leverage. Individuals who have lost their tail thus also lose a certain amount of agility. Fast-moving *Scincella cherriei* sometimes use their entire body in a snake-like, undulating fashion, bracing themselves against available surfaces and hardly using their short limbs.

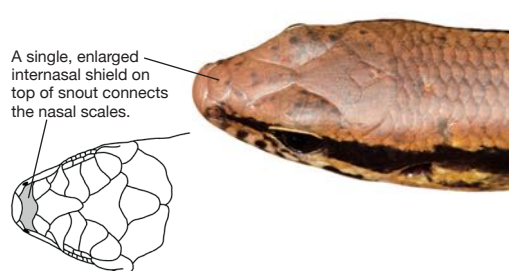
Reproduction in *Scincella cherriei* probably occurs year-round, although egg-laying seems to be less frequent during the height of the dry season. From 1–3 eggs are laid on the forest floor, without constructing any type of nest. Hatchlings reach sexual maturity after about 7 months.

Scincella cherriei is more often heard than seen as it moves in and out of the leaf litter layer.

Description



Dorsal surfaces of tail very dark brown to black in juveniles, but gradually change with age to match bronze or brown of the dorsum in adults.



Similar species

- *Marisora* species (pp. 252–257) always have a distinct lateral pale stripe.
- *Gymnophtalmus speciosus* (p. 267) lacks moveable eyelids, only has four fingers on each hand, and its body and tail are entirely covered in greatly enlarged scales.
- *Diploglossus bilobatus* (p. 92) is usually larger and more robust, has striated scales, and its claws are almost entirely covered with a scaly sheath.

Family Gymnophthalmidae
(Spectacled Lizards or Micro-teiids)

The family Gymnophthalmidae contains 243 species that principally occur in South America. Six species range into Costa Rica. The members of this taxonomically confusing and morphologically diverse family were formerly included in the family Teiidae and are occasionally referred to as micro-teiids because of their relatively small size.

Lizards of this family inhabit a wide variety of habitats; individuals have been found in leaf litter, in rotting logs, under fallen trees or rocks, and in burrows in loose soil. Some species inhabit arboreal bromeliads and epiphyte mats in the rainforest canopy, while others live a semi-aquatic life in small cascading streams.

The Costa Rican species in the family Gymnophthalmidae have variable body sizes and shapes, although all species have a slender, usually elongate, body and short, sometimes highly reduced limbs. Most species have relatively large, squarish ventral scales (like members of the Teiidae family), but in gymnophthalmid species the enlarged, square body scales tend to surround the entire body in continuous whorls.

Anadia ocellata
Ocellated Bromeliad Lizard

Least concern

A very slender arboreal lizard with a narrow, pointed head and an exceedingly long, prehensile tail. Its body and tail are covered with many rows of smooth squarish scales that completely encircle the body. Standard length to 3.0 in (75 mm), total length reaches 8.5 in (216 mm).

Anadia ocellata is only known from a few scattered locations in the Pacific and Atlantic foothills, from northwestern Costa Rica to central Panama; 1640–4265 ft (500–1300 m).

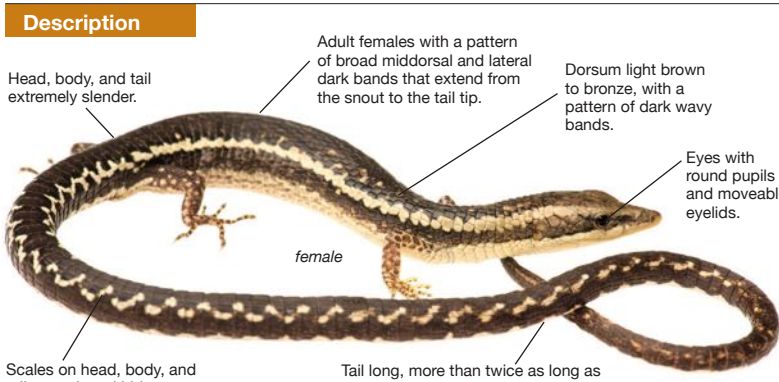
Natural history

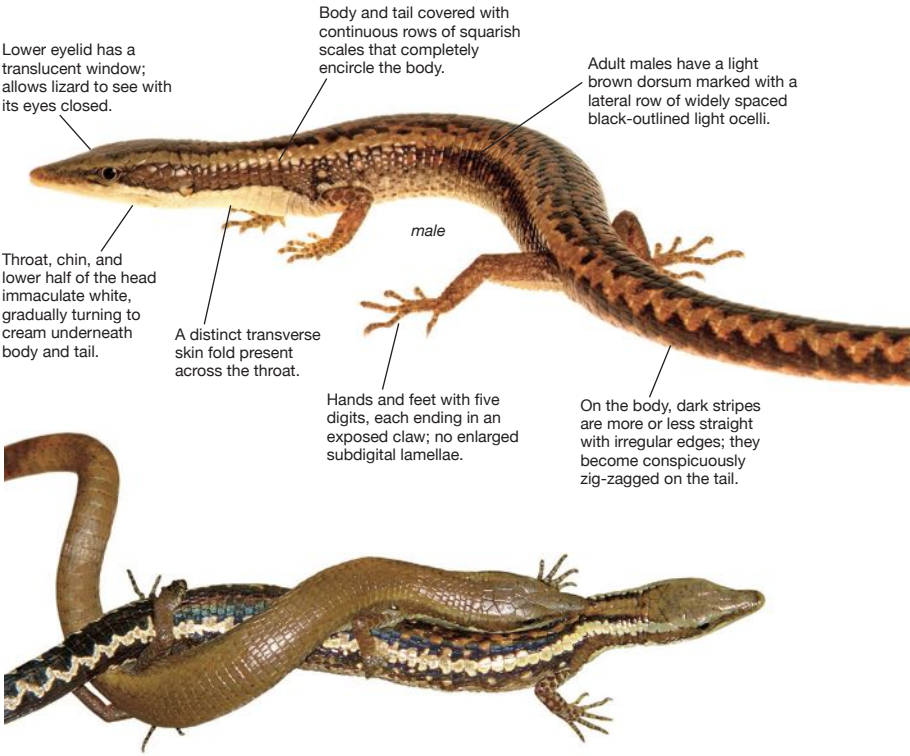
Anadia ocellata inhabits the crowns of rainforest trees; because it rarely ventures close to the forest floor, it is rarely seen. It has been suggested that the distribution of this species is correlated with the distribution of tank bromeliads (*Guzmania* species). However, personal observations indicate that these elongate lizards prefer small to very small bromeliads, as well as moss cushions, and the mats of epiphytic vegetation that adorn tree branches in the canopy. Individuals have been seen pushing their pointed head through the dense vegetation and moving in a snake-like fasion, often without using the small limbs. The long prehensile tail serves as a counterbalance and, more importantly, as an anchor when moving on very small twigs high above the forest floor. Individuals have been seen in tree crowns, at heights of 110 ft (33.5 m) above the ground, as well as on mossy branches some 5 ft (1.5 m) above ground, and even in the rafters of a research station.

Anadia ocellata seems most active on dry, sunny days, often in the morning and at midday. Individuals have been seen curled up at the base of bromelia leaf axils, which often contain standing water; they will curl up inside the bromeliad, with just the tip of the snout and the nostrils protruding above the water level, thus able to continue breathing.

Little is known about the reproductive behavior of *Anadia ocellata*; a mating pair was observed in March. This species is oviparous and produces small clutches of 1 or 2 eggs. A tiny individual, possibly a hatchling, was measured at 1 in (26 mm) in standard length and 2.8 in (70 mm) including the tail.

Description





Sexual dimorphism in *Anadia ocellata* is so striking that males and females were once thought to represent different species. Note the difference in color and pattern in this mating pair (male uniformly patterned, female with bold dark and light stripes).

Similar species

- *Echinosaura apodema* (p. 271) has a similar body shape, but it is semi-aquatic (not arboreal), and has pronounced dorsal keels.

Bachia blairi
Blair's Bachia

Least concern

A bizarre, snake-like lizard with a long tail, greatly reduced limbs (has only four tiny fingers on forelimbs and three on each hind limb), very small eyes, and no external ear openings. Standard length to 2.5 in (63 mm); total length reaches 6.3 in (160 mm).

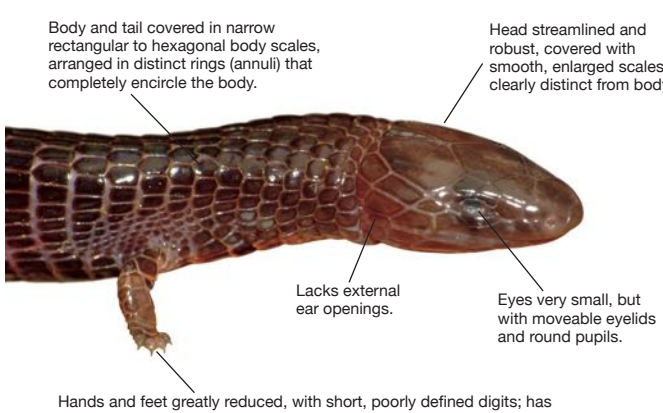
Bachia blairi is known from just a few records in southwestern Costa Rica, primarily on the Osa Pensinula and in adjacent Panama; from near sea level to 130 ft (40 m).

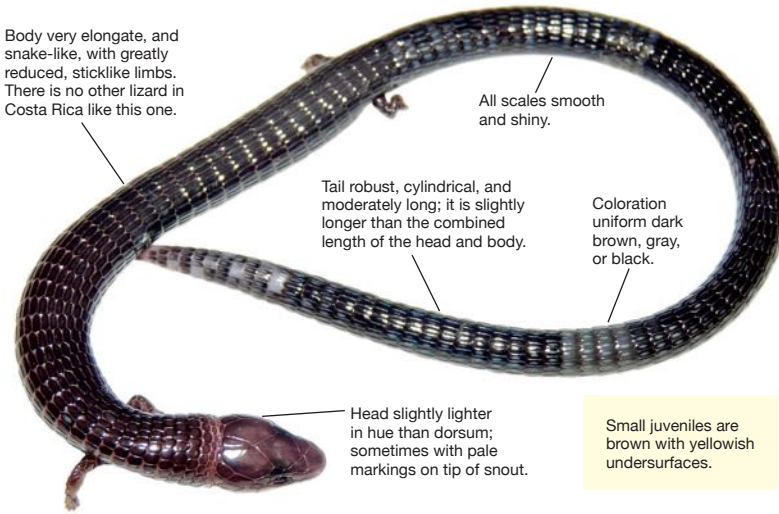
Natural history

The genus *Bachia* consists of 25 mostly South American species, and *Bachia blairi* is the northernmost representative of this unique group of lizards. It is a rarely seen denizen of leaf litter on the rainforest floor, often associated with the accumulations of leaves between buttressed roots of large trees. These lizards move through the matrix of leaves in a snake-like fashion, without using their limbs, and do not generally linger on the surface. Most individuals were discovered by sifting through leaf litter accumulations in appropriate habitat or were collected in pitfall traps.

Bachia blairii is insectivorous; prey items recovered from the stomachs of these lizards include small beetles and caterpillars. This is an oviparous species, and eggs and gravid females have been reported during the month of July. Apparently, the eggs are simply dropped in the leaf litter, not buried in a nest. The smallest known juvenile, possibly a recently hatched individual, measured 1 in (26 mm) in standard length.

Description





Very little information exists on the natural history of *Bachia blairi*. Its specialized body shape, combined with the smooth enlarged plates on its head and reduced limbs, indicate that this species spends considerable time underground in burrows. Like many other Gymnophthalmid lizards, it has a translucent window in its lower eyelid that enables it to see with its eyes closed. This individual is seen doing just that—possibly in response to the bright light above ground.

Similar species

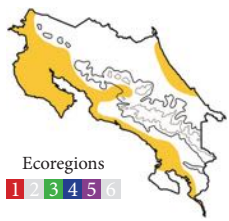
- This species is unlike any other lizard in Costa Rica.

Gymnophthalmus speciosus

Golden Spectacled Lizard (*Cola Roja*)

Least concern

A small, skinklike lizard that lacks moveable eyelids and has only four fingers on each hand (all other species have five digits). Typically has whorls of very large, smooth scales surrounding its body, and a brick red tail. Standard length to 1.7 in (44 mm) total length to 4.8 in (122 mm).



Gymnophthalmus speciosus is widespread in Central America. It ranges along both slopes from eastern Guatemala on the Atlantic slope and Tehuantepec, Mexico, on the Pacific slope, south into northern South America. In Costa Rica, it is primarily found in relatively dry habitats along the Pacific slope, but occurs locally on the Atlantic slope as well; from near sea level to 4000 ft (1220 m).

Natural history

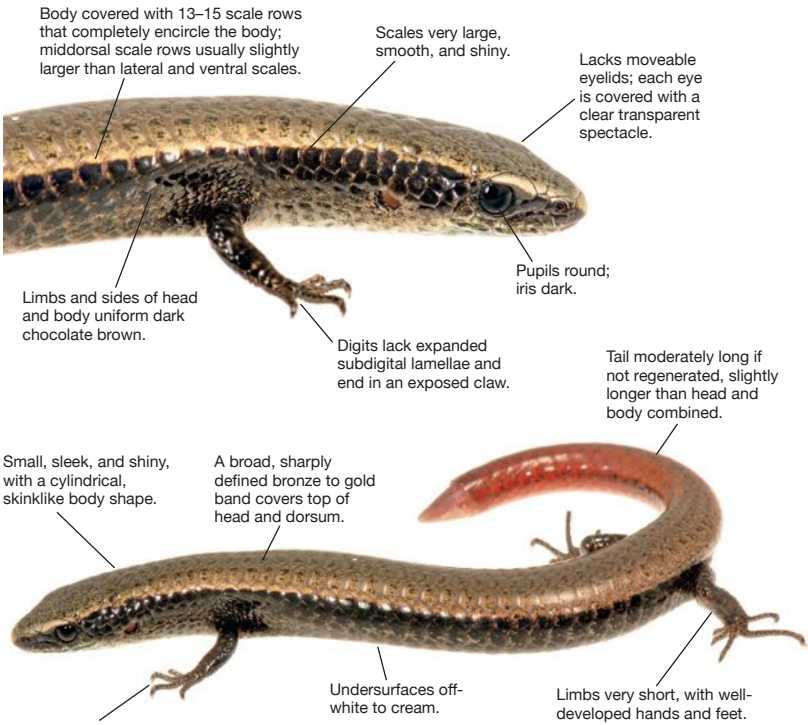
Eight species of *Gymnophthalmus* occur throughout much of mainland South America, as well as the islands of Trinidad and Tobago, and some of the Antillean Islands. Of these eight, only *Gymnophthalmus speciosus* ranges widely into Central America. This is the northernmost representative of the family Gymnophthalmidae.

These secretive, diurnal leaf-litter lizards inhabit relatively open areas bordered by forest. Although locally common, *Gymnophthalmus speciosus* is often overlooked, as the most common clues to its presence are only subtle movements and a soft rustling in the leaf litter. And, because of its small size, these lizards can move freely through and beneath the leaf litter without being seen. It can be common in disturbed areas such as gardens, plantations, and coffee farms, and seems to prefer areas with surface debris and an open canopy. *Gymnophthalmus speciosus* is most active during the hottest hours of sunny days, and retreats into burrows or under rocks and logs when the temperature drops.

If the tail is intact, the color tends to be a bright brick-red or red. Presumably, this striking coloration diverts attention away from more vital body parts when the lizard is under attack by a predator. In some areas, the incidence of tail breakage is very high, and only rarely does one encounter an individual with an intact tail. Clearly, the predation pressure on these small lizards can be substantial.

Gymnophthalmus speciosus is oviparous and produces several small clutches of eggs each year. In some parts of its range, this species is parthenogenetic; these populations consist solely of females who produce female offspring from unfertilized eggs.

Description



If not previously broken off, the tail is usually bright brick-red (the common local name is *cola roja*, or red tail).

Similar species

- *Scincella cherriei* (p. 260) has five digits on each front limb, moveable eyelids, and lacks the red tail.
- Skinks in the genus *Marisora* (pp. 252–257) are bigger and have a bold white lateral stripe.
- *Diploglossus bilobatus* (p. 92) has moveable eyelids and five digits on each forelimb.

Loxopholis southi
Northern Rugose Lizard

Least concern

A small leaf litter lizard with a distinctly rugose appearance created by the heavily keeled scales on its head, body, tail, and limbs. The distinctly keeled, enlarged head scales are diagnostic. Standard length to 1.6 in (41 mm); total length to 3.9 in (100 mm)

Loxopholis southi occurs along both slopes, from northern Costa Rica to Colombia, from near sea level to 2295 ft (700 m).

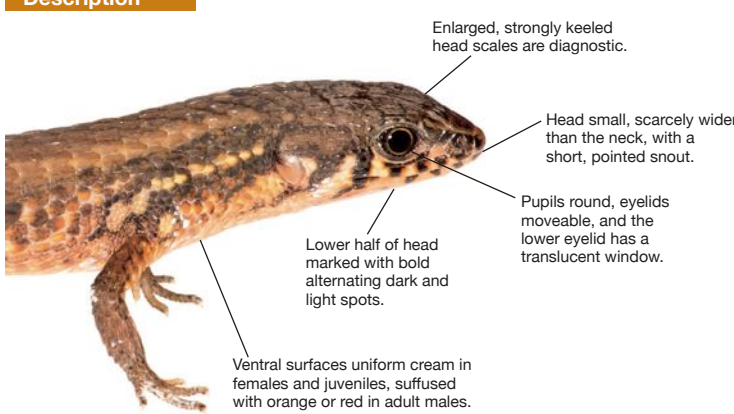
Natural history

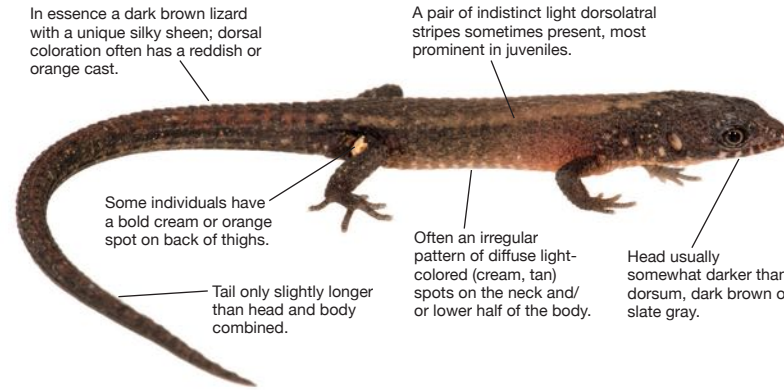
This is a small genus of 13 predominantly South American leaf litter lizards; 2 species of *Loxopholis* occur in Central America, but only 1 reaches Costa Rica. This is a locally common species that is often difficult to see; it spends most of its time within the multi-layered leaf litter that covers the lowland forest floor. Individuals are most often seen while they forage during the day, as they dart in and out of the leaf litter. It is most active early in the morning and late afternoon.

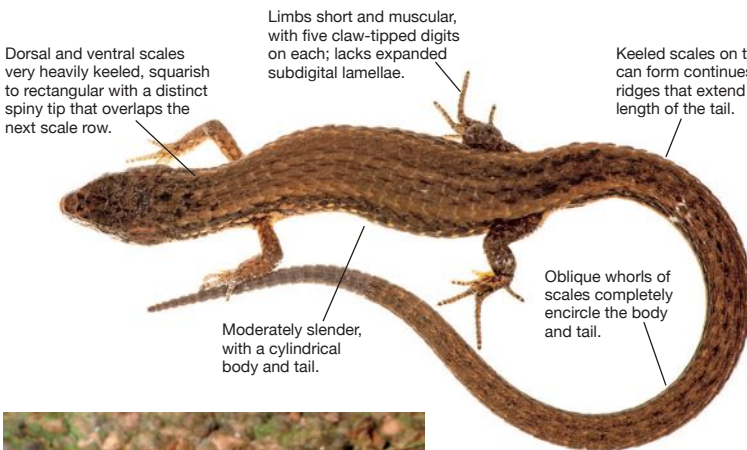
Most leaf litter lizards tend to increase in numbers when trees drop their leaves, causing the leaf litter layer to increase in thickness. This generates additional habitat, creates more suitable microclimates, and generally leads to a higher invertebrate prey population, all factors that support a higher population density. Although the leaf drop in deciduous tropical trees is not synchronized like it is in autumn in temperate zones, when virtually all trees lose their foliage, the leaf litter substrate generally increases in thickness toward the end of the dry season. This creates suitable conditions for the breeding season to commence once the rains begin, at which point females lay clutches of up to two eggs at a time.

This species was previously known as *Leposoma southi* and generally appears in older literature under that name.

Description







Individual *Loxopholis southi* from Pacific slope populations tend to have a reddish brown iris, whereas Atlantic slope individuals have dull brown eyes.

Similar species

- Most similar to *Ptychoglossus plicatus* (p. 273), which lacks keeled head scales, and is very shiny.
- *Gymnophthalmus speciosus* (p. 267) has a red tail, lacks moveable eyelids, and has smooth scales.
- *Scincella cherriei* (p. 260) has smooth scales covering its head, body, and tail.

Echinosaura apodema
Water Tegu

Least concern

Exceedingly slender, with a narrowly pointed head, slightly compressed tail, and four rows of enlarged, strongly keeled scales on its back and tail that form obvious, diagnostic ridges. Semi-aquatic. Standard length to 2.2 in (57 mm) in males and 2.7 in (68 mm) in females; total length to 6.5 in (165 mm).

Echinosaura apodema occurs in isolated stream courses in the lowlands and foothills of southwestern Costa Rica and adjacent Panama, from near sea level to at least 4135 ft (1260 m).

Natural history

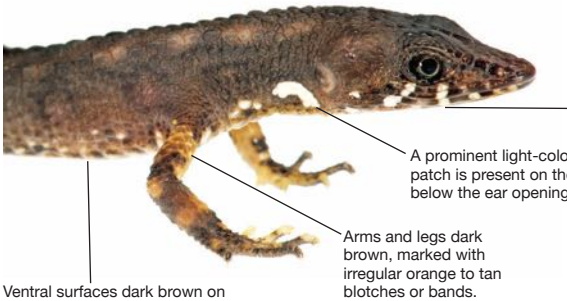
The genus *Echinosaura* contains eight species in northern South America and southern Central America. *Echinosaura apodema* was long included in the genus *Neusticurus* and, more recently, in the genus *Potamites*. Both genera are primarily South American in origin, and the presence of an outlier species in southwestern Costa Rica and adjacent Panama, several hundred miles distant from the nearest related species, always seemed illogical. A recent study of the small, semi-aquatic lizards of the genus *Echinosaura* showed a close affinity between this species and the miniature crocodile-like lizards of the genus *Echinosaura*, which ranges into adjacent Panama, and it is now assigned to that genus.

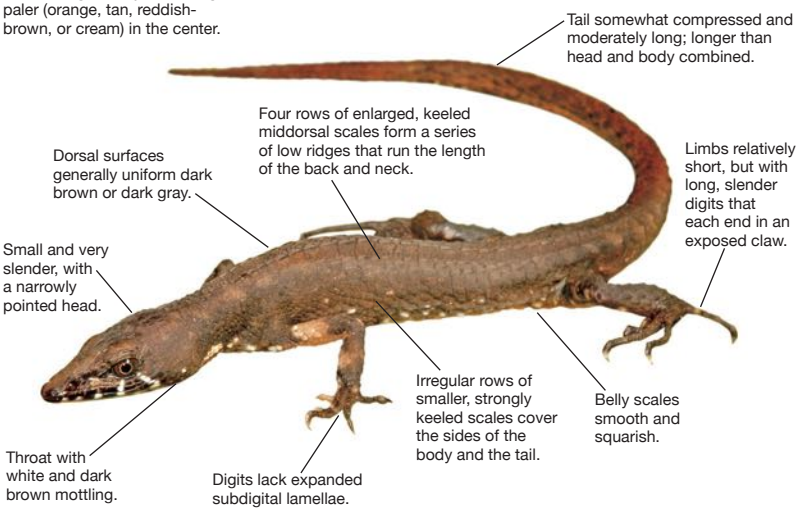
Echinosaura apodema inhabits the banks of cascading mountain streams in undisturbed rainforest and premontane forest habitats. During the dry season, individuals can be found hiding in rock piles and under drift wood in mostly dry stream beds. They also inhabit the accumulation of debris jammed between rocks or logs along the high-water mark in stream beds.

Limited observations indicate that this species commonly enters the water at dusk and after dark. It has been observed wading and swimming in shallow sections of small streams; the slightly compressed tail enhances its ability to swim. Panamanian *Echinosaura* species are somewhat smaller, with a shorter snout, and have been observed eating small spiders and beetles. Whether the same is true for *Echinosaura apodema* is not clear, but the relatively long and slender snout in this species may hint at a different diet, one consisting of smaller invertebrates.

As is the case in other semi-aquatic lizards in Costa Rica (e.g. *Anolis aquaticus* and *Anolis oxylophus*), individuals of this species appear to become readily stressed by heat; they seem to prefer relatively cool temperatures and show signs of distress when held in the hand for too long.

Description





Echinosaura apodema is a strange, partly aquatic lizard with a distinct series of pointed scales and ridges that cause it to somewhat resemble a miniature crocodile. It is rarely seen because of its small range and very particular habitat preference.

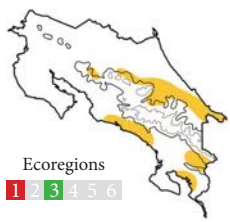
Similar species

- *Anadia ocellata* (p. 263) is similar in body shape but it is arboreal and lacks the ridges on the back and tail.

Ptychoglossus plicatus
Taylor's Large-scaled Lizard

Least concern

A medium-sized, fairly robust leaf litter lizard with shiny, keeled dorsal scales that are elongated and slightly overlapping. Dorsal, lateral, and ventral scale rows are continuous and form annuli around the body. Scales on the head and neck are shiny and smooth. Standard length to 2.7 in (68 mm); total length to 7.9 in (200 mm)



Ptychoglossus plicatus ranges from northeastern Costa Rica on the Atlantic slope and central Costa Rica on the Pacific slope to northern Colombia; from near sea level to 5575 ft (1700 m).

Natural history

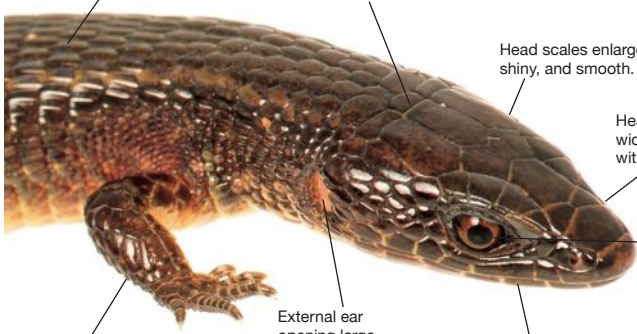
Members of the genus *Ptychoglossus* are small to medium-sized, slender lizards that inhabit the leaf litter. They are predominantly found in northern South America. Of the 14 species in this genus, only *Ptychoglossus plicatus* ranges as far north as Costa Rica. This is a relatively uncommon species of lowland and premontane forests that is easily overlooked. *Ptychoglossus plicatus* is diurnal and forages within, and on top of, the leaf litter layer on the forest floor. It is secretive and dives into the leaf litter at the first sign of disturbance. These lizards often fold their limbs back against the body and move in a snake-like fashion when maneuvering rapidly through the dense matrix of dead leaves and debris.

Ptychoglossus plicatus is oviparous and produces clutches of two eggs at a time. Like many other leaf litter lizards, this species appears to be most common towards the end of the dry season (March and April). This is when the leaf litter layer is thickest and insect populations are at their highest; reproduction tends to peak when prey availability is high.

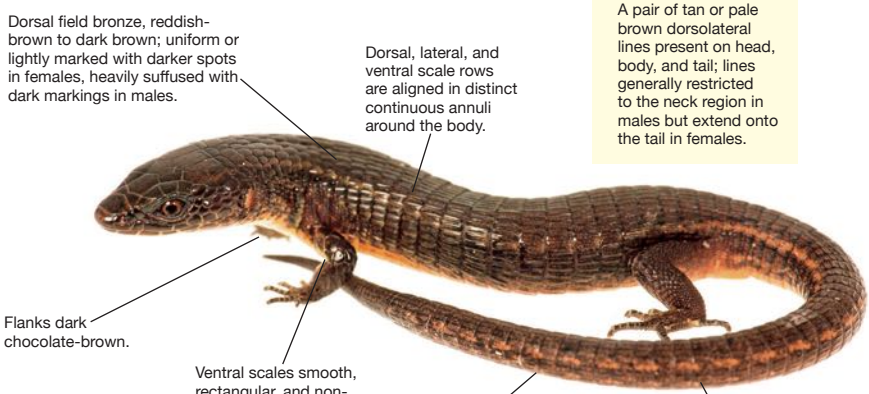
Description

Juveniles usually have a lighter brown coloration and short dorsolateral light lines that only extend onto the neck; venter immaculate.

A medium-sized, relatively stocky leaf litter lizard with a cylindrical to slightly flattened body.



A pair of tan or pale brown dorsolateral lines present on head, body, and tail; lines generally restricted to the neck region in males but extend onto the tail in females.



Similar species

- *Gymnophthalmus speciosus* (p. 267) lacks moveable eyelids and has very large, rounded scales on its body and tail.
- *Loxopholis southi* (p. 269) has distinctly keeled head scales and a dull, velvety (not shiny) luster on its scales.
- *Scincella cherriei* (p. 260) has smooth dorsal scales that are not arranged in continuous whorls.
- *Diploglossus bilobatus* (p. 92) has striated dorsal scales that are not arranged in continuous whorls.

Family Teiidae
(Whiptail Lizards and Tegus)

These are active, terrestrial lizards. The members of this large family are restricted to the Americas, ranging from Canada and the northern United States south through Central America and into southern South America. The taxonomy of this group has seen various changes in recent years, but currently 18 genera and at least 159 species are recognized.

Members of the family Teiidae are medium-sized to very large, streamlined lizards with an attenuate head, a relatively slender and elongate body and neck, a long tail, and powerful limbs. They are predominantly day-active insect feeders, emerging from their hiding places to search out prey only when the sun is shining and the ambient temperature is high. Most teiids are heliotrophs and are found in relatively dry and hot areas, although a few species do inhabit open situations in humid rainforest habitats.

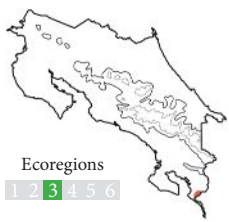
Members of the family Teiidae have minute granular scales covering the upper surfaces of the body and large plates on the head. The ventral scales are large and rectangular and generally arranged in longitudinal series. A distinct transverse gular skin fold separates the belly from the throat region. The tail is adorned with enlarged, squarish scales that are prominently keeled and arranged in whorls around the tail. These scalation characteristics, combined with the presence of moveable eyelids, and a pupil that is uniquely kidney shaped, with an indentation at the ventral edge, separate teiids from all other Mesoamerican lizards. Three genera, *Ameiva, Aspidoscelis*, and *Holcosus* occur in Costa Rica; the small differences among these three genera are discussed in the species accounts.

Ameiva ameiva

Least concern

South American Whiptail (*Chisbala Suramericana*)

A speedy, sleek lizard with a long tail, pointed head, and powerful limbs; head covered with large plates, body with tiny granular scales, venter with smooth square plates, and tail encircled by whorls of rectangular plates. Eyes with a kidney-shaped pupil. Males have a pattern of light spots; females and juveniles have 4 or 5 light stripes on a brown background. Standard length to 7.8 in (197 mm) in males, 6.2 in (157 mm) in females; total length to 25.2 in (640 mm).



Ameiva ameiva ranges widely throughout much of South America and occurs on several Caribbean islands, including San Andrés and Providencia, off the coast of Nicaragua. In Central America, it occurs along both slopes of eastern Panama, and ranges westward along the Pacific slope to reach extreme southwestern Costa Rica. It occurs only near sea level in Costa Rica, but elsewhere it is found up to 2300 ft (700 m).

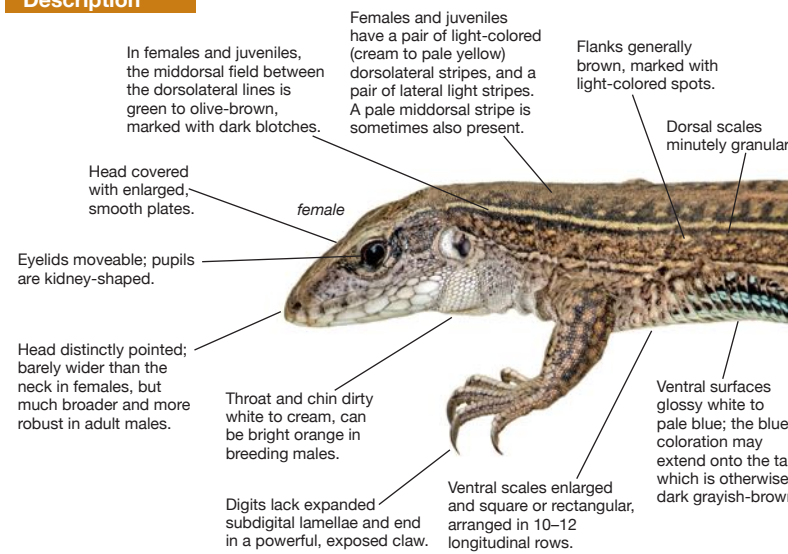
Natural history

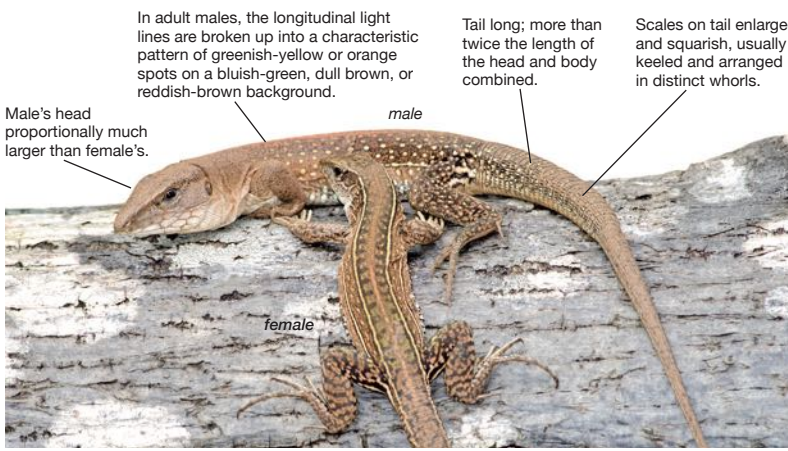
Ameiva ameiva is the northernmost of 13 species of *Ameiva*. It is an extremely widespread species in South America and some Caribbean islands, and several geographic races are recognized. *Ameiva ameiva* ranges into lower Central America throughout Panama, and is known from a single recent record in Costa Rica.

This is a species of hot, relatively dry, open areas; in South America, it inhabits savanna and grassland habitat. In forested regions, this species is invariably found along the edge of clearings, roads, or other open areas. It is quite adaptable and can be found in gardens, parks, and agricultural areas (mainly banana and coconut plantations). In managed habitats, these lizards have been observed hiding in piles of discarded plant materials and yard clippings. Like most teiids, this species retreats into underground burrows when weather conditions are not favorable, or to escape predators, which it does at great speed. The mounds of decaying plant material possibly provide suitable locations to lay their eggs.

Given its preference for open, managed areas, it has been suggested that conversion of closed-canopy habitat into open and drier habitat is leading to the spread of *Ameiva ameiva*. If that is the case, this species will likely spread farther into Costa Rica in future years.

Description





Similar species

- No other whiptail lizard in the region has 10–12 rows of ventral scales and a spotted dorsal pattern in adult males.
- *Holcosus festivus* (p. 280) has a prominent pale yellow middorsal stripe (sky-blue on the tail in juveniles); dorsum and flanks dark, with vertical light dashes and stripes.
- *Holcosus leptophrys* (p. 282) has a middorsal field with scalloped edges and a pattern of vertical bars on the flanks.
- *Holcosus quadrilineatus* (p. 284) is similar to females of *Ameiva ameiva*; while it also has four pale longitudinal stripes, it never has a middorsal light stripe.

Aspidoscelis deppii

Least concern

Deppe's Racerunner (*Chisbala Rayada*)

A beautiful, streamlined lizard with a long tail, pointed head, and powerful limbs. Has a distinctive pattern, with 9 or 10 light longitudinal stripes on a dark brown to reddish-brown background. Juveniles have a bright electric-blue tail; males have extensive blue markings on limbs and undersurfaces. Standard length to 3.7 in (93 m) in males and 3.2 in (81 mm) in females; total length to 11.8 in (300 mm).

Aspidoscelis deppii occupies dry regions, from Veracruz and Guerrero, Mexico, to northwestern Costa Rica; from near sea level to 2625 ft (800 m).

Natural history

Members of this genus are medium-sized to large, slender, streamlined lizards that are similar in overall morphology to those of the genus *Holcosus*. They share most of the typical scalation characteristics of the latter genus but differ in having three or more rows of moderately enlarged scales on each upper arm; and on the dorsum they usually have six or more light longitudinal stripes or rows of distinct white spots.

Currently the genus *Aspidoscelis* includes at least 45 species, several of which are unisexual (all female) and reproduce through parthenogenesis, resulting in female offspring only. The single Costa Rican species, *Aspidoscelis deppii*, is bisexual and its populations contain both males and females.

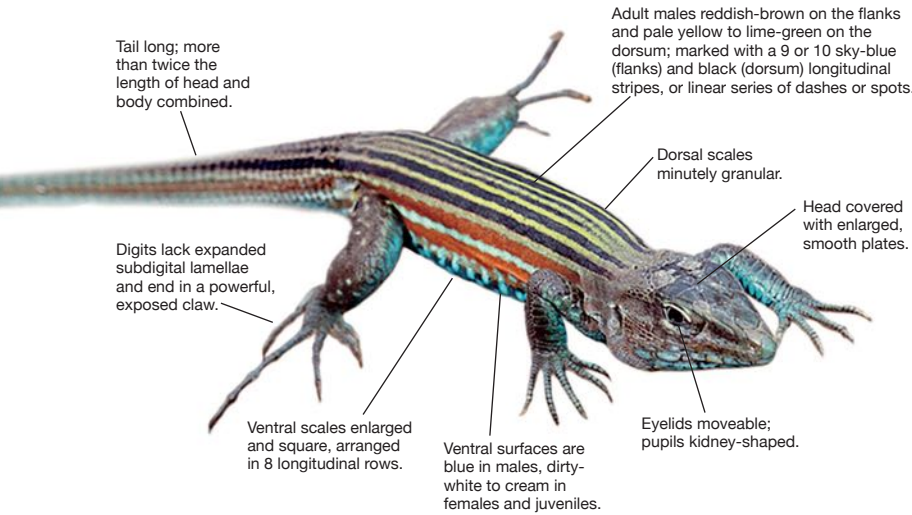
This fast-moving lizard is found in hot, dry, sparsely vegetated open areas such as dry river beds, overgrazed pastures, coconut groves, and areas of herbaceous vegetation lining beaches. *Aspidoscelis deppii* is active only on warm, sunny days. When the ambient temperature drops or when clouds obscure the sun, they retreat into their burrows. The body temperature of this species can reach 108 °F (42 °C); sometimes it is 48–54 °F (9–12 °C) higher than the ambient air temperature. *Aspidoscelis deppii* locally co-occurs with another teiid, *Holcosus undulatus,* but seems to have a greater preference for open, sun-exposed areas than the latter species.

Aspidoscelis deppii is oviparous and produces clutches of 1–4 eggs several times per year; oviposition takes place predominantly in the rainy season and sometimes stops completely during the driest months of the year. In areas with a less pronounced dry season, reproduction may continue year-round but at a slower rate in the drier months.

This species was previously referred to as *Cnemidophorus deppii.*

During mating, male teiid lizards bite the female on the back to restrain her. Adult females often show scarring on the back and neck as a result of this behavior.

Description



Small juveniles are dark brown to reddish-brown, with a pattern of 9 or 10 longitudinal pale yellow stripes, a white venter, and a bright blue tail.

Adult females retain the juvenile color pattern, but the blue on the tail gradually darkens to brown.

Similar species

- No other lizard in Costa Rica has a dark dorsum with 9 or 10 light longitudinal stripes.

Holcosus festivus

Least concern

Central American Whiptail (*Chisbala Centroamericana*)

A colorful, streamlined lizard with a long tail, pointed head, and powerful limbs. Typically has a pale yellow or cream middorsal stripe (can be obscured in old males). In juveniles, middorsal stripe continues well onto tail and is strikingly bright blue. Overall dark color pattern marked with dorsolateral series of yellow dashes and irregular, orange-red vertical lines on the flanks. Standard length to 5.1 in (129 mm) in males, and 4.3 in (110 mm) in females; total length to 13.8 in (350 mm).

Holcosus festivus is widespread along the Atlantic slope of Central America, ranging from Tabasco, Mexico, southward into northern Colombia. Also occurs on the Pacific slope, in southwestern Costa Rica, Panama, and western Colombia. From near sea level to 3940 ft (1200 m).

Natural history

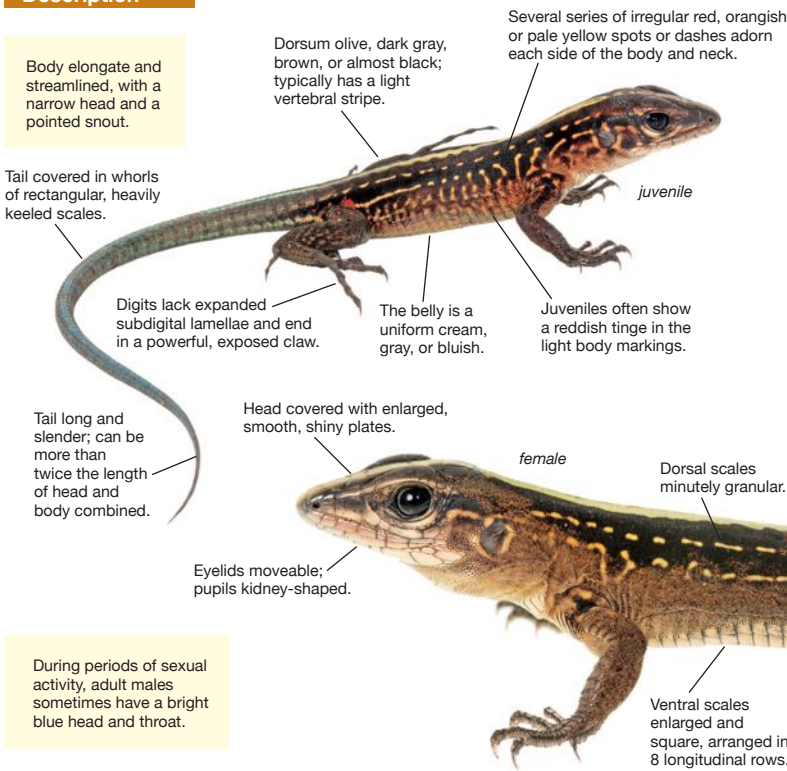
Ameiva festiva is a commonly seen lizard in lowland and premontane forests, and in areas of older secondary vegetation. Although it does occur deep within the forest interior, this is mainly a species of edge situations and is most common in tree-fall areas, along roads and trails, or in other areas where the sun reaches the forest floor. Individuals are most frequently seen basking in mid-morning, on sunny days in a sun-exposed spot. When they have reached their preferred body temperature (93–104 °F [34–40 °C]), they begin scanning the forest floor for food. In search of insect prey, these lizards run short distances, moving jerkily and frequently stopping to dig in the leaf litter using their front paws. Grasshoppers and spiders constitute most of the diet. In one study, small amphibians were found in the stomach of nearly 10% of the individuals examined; large indiviudals readily consume the small leaf litter frogs (and likely also small lizards) that are flushed on their search for invertebrate prey.

When disturbed, these skittish lizards will rapidly escape into a nearby burrow or into dense tangles of vegetation. During the early morning hours, as these lizards bask to achieve their optimum body temperature, they often remain still in their basking spot, relying on their camouflage and waiting until the last second to escape any perceived threat. As a result, hapless hikers on forest trails sometimes startle when one of these lizards explodes from nearly underfoot. Often, these lizards run a short distance and then slowly circle back to their preferred spot in the sun.

Ameiva festiva appears to reproduce yearround. Females produce clutches of 1–4 eggs several times per year. The leathery-shelled eggs of this species are elliptical in shape and laid in a shallow depression in the ground, usually covered with a thin layer of soil. Hatchlings require 3–6 months to reach sexual maturity.

Description

Body elongate and streamlined, with a narrow head and a pointed snout.



During periods of sexual activity, adult males sometimes have a bright blue head and throat.

Juveniles have an electric-blue tail and a prominent, pale vertebral stripe. The tail darkens in adults, and in very old individuals the vertebral stripe may also become obscured. Adult males are generally more robust than females; they have a broader head that, in large adults, is sometimes wider than the neck.

Similar species

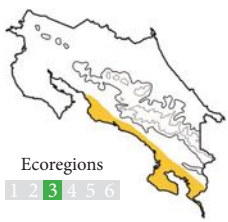
- *Holcosus leptophrys* (p. 282) has a broad middorsal band with scalloped edges instead of a pale vertebral stripe.
- *Holcosus quadrilineatus* (p. 284) lacks a light-colored vertebral stripe but has a pair of lateral and dorsolateral light stripes.

Holcosus leptophrys

Delicate Whiptail (*Chisbala Pacífica*)

Least concern

A relatively slender, streamlined lizard with a long tail, pointed head, and powerful limbs. Typically has a brown or bronze middorsal field with scalloped edges, but no pale middorsal stripe. Flanks darker than middorsal field, and marked with vertical dark bars or blotches and a longitudinal series of light spots and dashes. Standard length to 5.2 in (133 mm) in males, slightly less in females; total length to 17.3 in (439 mm).



Holcosus leptophrys ranges south from central Costa Rica to western Colombia on the Pacific slope; it also occurs on the Atlantic slope in central and eastern Panama; from near sea level to 2295 ft (700 m).

Natural history

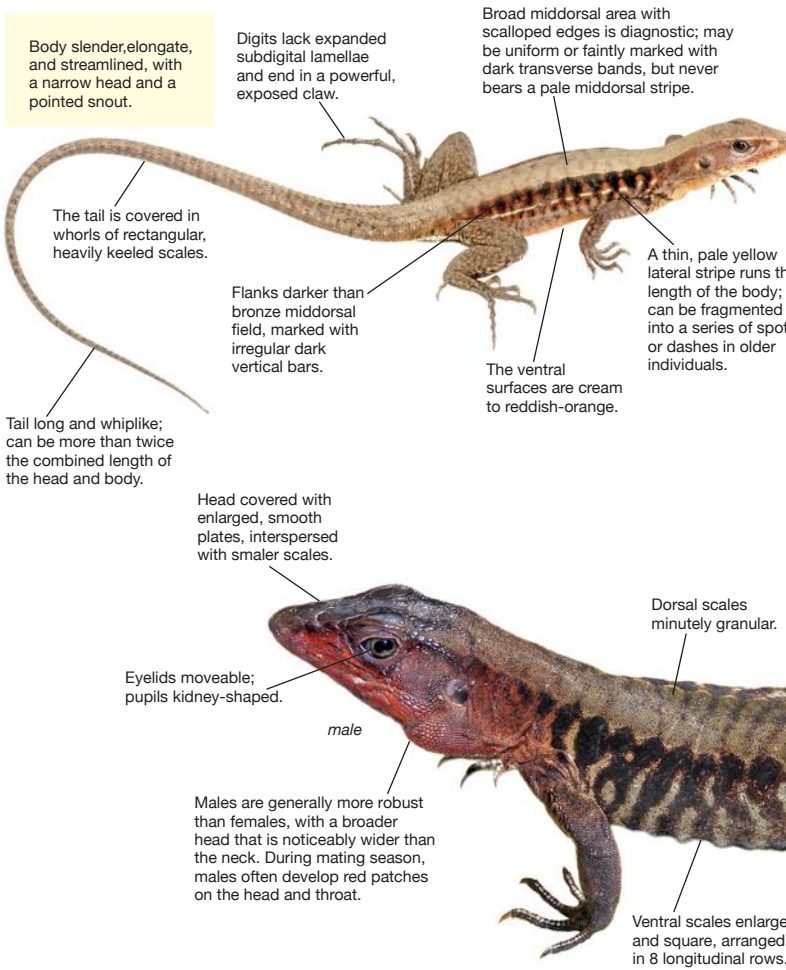
Holcosus leptophrys is similar in appearance and behavior to *Holcosus festivus*, and both species are more likely to occur in forested habitats than the other Costa Rican teiids, which seem to prefer open, disturbed areas. This species occurs in relatively undisturbed forest; it ventures deep into the densely shaded understory in search of insect prey, although its activity generally centers on areas where sunlight reaches the forest floor. Forest clearings, tree fall areas, edges of trails and forest roads, and dry stream beds provide the habitat edges that *Holcosus leptophrys* prefers. Individuals bask early to mid-morning on sunny days. In unfavorable weather conditions, periods of heavy rain or cooler temperatures, these lizards remain inside their burrows, which are often located between tree roots, or underneath logs or boulders.

Adults tend to be more active earlier in the morning than juveniles, which emerge during late morning and forage into the early afternoon. These lizards primarily feed on invertebrates but may occassionally consume small vertebrates (leaf litter frogs or juvenile lizards) that are flushed during their forays. When hiking quietly in a forested area, it is easy to find foraging teiids if one is attentive to the rustling sounds they make as they forage loudly, scurrying and scraping through the dry leaf litter. If disturbed when basking or foraging in a sunny spot, these animals will run a short distance and then continue their activities; if pressed further, they rapidly retreat into their burrow.

Ameiva leptophrys is oviparous and lays small clutches of leathery-shelled eggs in a small depression in the forest floor; most juveniles hatch in the rainy season.

Description

Body slender,elongate, and streamlined, with a narrow head and a pointed snout.



Similar species

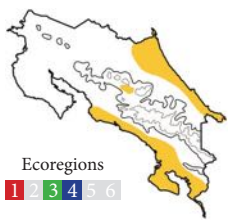
- *Holcosus festivus* (p. 280) is most similar in shape and size, but it has a distinct, light-colored middorsal stripe.
- *Holcosus undulatus* (p. 286) shares vertical dark bars on its flanks, but lacks the scalloped-edged, pale middorsal band.
- *Holcosus quadrilineatus* (p. 284) has a pair of lateral and dorsolateral light stripes, not vertical bars.

Holcosus quadrilineatus

Least concern

Four-lined Whiptail (*Chisbala de Cuatro Rayas*)

A medium-sized, streamlined lizard with powerful limbs, a pointed head, and a long, whiplike tail. Has a lateral and a dorsolateral light stripe on each side of the body and head, but never has a middorsal light stripe. Standard length to 3.5 in (88 mm) in males, and 3.2 in (82 mm) in females; total length to 11.0 in (280 mm).



Holcosus quadrilineatus occurs in lowlands and foothills on the Pacific slope of western Panama and southwestern and Central Costa Rica, and on the Atlantic slope from western Panama to southeastern Nicaragua; from sea level to 4500 ft (1375 m).

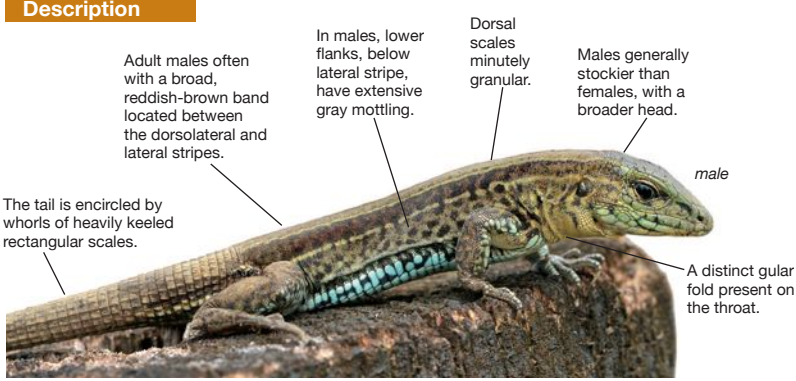
Natural history

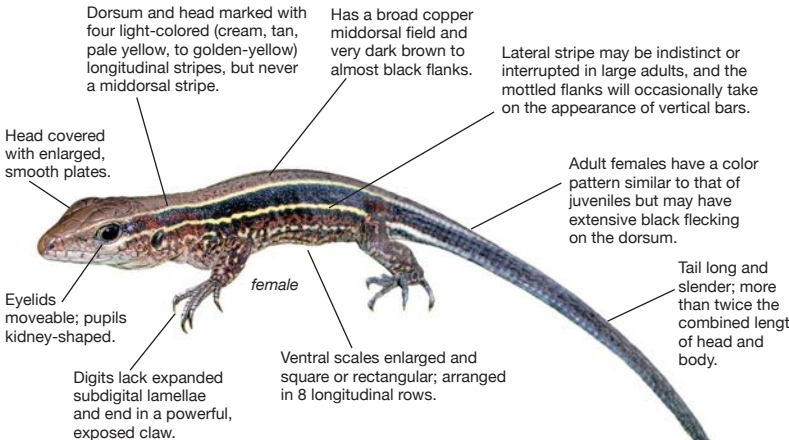
Holcosus quadrilineatus is an abundant lizard most often seen in open situations such as forest edges, roadsides, plantations, and in the sparsely vegetated strips of coconut palms that line most beaches. This species rarely enters forest interiors, but instead prefers hot and dry areas in relatively disturbed settings. It is commonly seen near human settlements, and is not particularly shy. Although this is generally a species of lowland settings, recent observations of these lizards in coffee plantations and gardens in the Central Valley, near Heredia, may be of individuals who were inadvertently introduced. Nevertheless, the fact that these lizards can survive, or even prefer, severely altered habitats may mean that *Holcosus quadrilineatus* is expanding its range throughout Costa Rica.

Individuals emerge early on sunny days to bask, after which they spend most of the morning hours foraging for small invertebrates. On overcast or rainy days, they rarely leave their terrestrial retreat. When foraging, individual *Holcosus quadrilineatus* seem to be in constant motion; they move in a jerky manner between clumps of vegetation, continuously examine crevices, and probe the leaf litter for prey items.

Reproduction in this species occurs yearround, but peaks in the early part of the rainy season. Females lay small clutches of 1–3 eggs that are loosely buried in the soil. Hatchlings measure about 1.2 in (3.0 cm) in standard length and mature in about 6 months.

Description





Breeding males have extensive orange or red on their head and throat.

Stripes are most prominent in juveniles, which also have a blue tail and blue flecking on the limbs (blue coloration disappears with age).

Similar species

- *Holcosus leptophrys* (p. 282) has a scalloped-edged middorsal field. Some individuals have pale lateral stripes (like *Holcosus quadrilineatus*) but never have paired dorsolateral stripes.
- *Holcosus festivus* (p. 280) has a distinct middorsal light stripe (and a blue tail stripe in juveniles).
- *Holcosus undulatus* (p. 286) has alternating dark and light vertical bars on the flanks and lacks light longitudinal stripes.
- *Aspidoscelis deppii* (p. 278) a dorsal pattern of 9 or 10 light longitudinal stripes.

Holcosus undulatus

Least concern

Rainbow Whiptail (*Chisbala Arcoiris*)

A robust, streamlined lizard with a long tail, pointed head, and powerful limbs. Typically has a straight-edged, brown middorsal field and a pattern of alterating dark and light vertical bars on its flanks; it lacks a middorsal light stripe. Juveniles and some females have a lateral light-colored stripe that disappears with age. Males to 5.1 in (129 mm) in standard length, females to 4.4 in (111 mm); total length to 16.5 in (420 mm).

Holcosus undulatus ranges from the central Pacific coast of Costa Rica to northern Mexico; on the Atlantic slope, it occurs from northern Mexico to northeastern Nicaragua. In Costa Rica, it is found throughout the northern Pacific lowlands and locally in the western Central Valley. From near sea level to 4265 ft (1300 m).

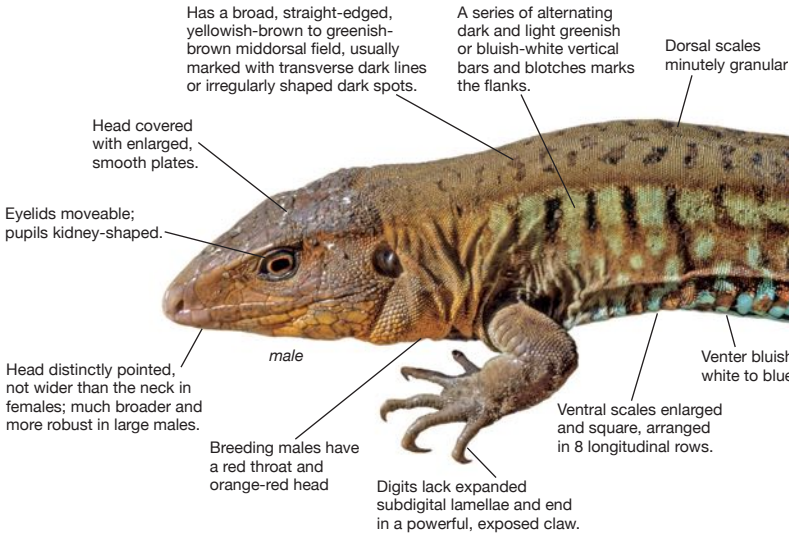
Natural history

This common and conspicuous lizard is easy to see in a variety of open situations such as roadsides, plantations, grasslands, gardens and parks, and the vegetation lining beaches. *Holcosus undulatus* is far more prevalent in managed, altered habitats, and generally avoids closed canopy forests.

This fairly large lizard is most active from mid-morning on, once the sun has warmed up its surroundings. Individuals bask in sun-exposed areas in the early morning, and continue foraging once their body temperature reaches an optimum level, 91–106 °F (33–41 °C); its optimum body temperature is generally several degrees higher than the ambient temperature. Once active, they continually hunt for insects and other small invertebrates, and forage loudly as they scrape their front paws through the leaf litter or clumps of dense vegetation, often probing crevices with their head. During the hottest times of day, but also on overcast or rainy days and at night, these lizards retreat into terrestrial burrows.

Reproductive activity in *Holcosus undulatus* continues year-round, except for a hiatus during the hottest, driest months in areas with a severe dry season. Females produce clutches of 2–7 eggs every few weeks during the reproductive season and deposit the eggs in shallow depressions in the soil. Hatchlings are most numerous during the rainy season and grow quickly; young may reach sexual maturity in about 6 months.

Description



Tail long and slender; more than twice the standard length. Tail encircled by distinct whorls of heavily keeled, rectangular scales.

The vertical "zebra stripes" on adult *Holcosus undulatus* are generally a good field mark. Juveniles and females are characterized by a broad middorsal field. *Holcosus undulatus* never has a pale middorsal stripe.

A thin, pale-yellow dorsolateral stripe sometimes marks the edge of the middorsal field; a lateral longitudinal thin stripe crosses the flank pattern. These lines are often broken up or poorly defined in all but the smallest of juveniles.

Similar species

- *Holcosus leptophrys* (p. 282) has a middorsal field with scalloped edges.
- *Holcosus festivus* (p. 280) has a pale middorsal stripe; juveniles have a blue tail.
- *Holcosus quadrilineatus* (p. 284) has a pair of light-colored lateral stripes and a pair of dorsolateral stripes.
- *Aspidoscelis deppii* (p. 278) has a pattern of 9–10 longitudunal pale lines.

Family Xantusiidae
(Night Lizards)

The family Xantusiidae is small, with just 3 genera and some 34 species; all members are found exclusively in the New World. Most inhabit the southwestern United States and Mexico, 2 species are endemic to Cuba, and only 4 species range into Central America. The 2 Costa Rican representatives of this group are both in the genus *Lepidophyma*.

Xantusiid lizards lack moveable eyelids; their eyes are covered with a transparent spectacle instead. All have round pupils. Their head is armored with large, symmetrical, smooth plates. The venter has enlarged rectangular smooth scales in longitudinal rows. The dorsum, limbs, and tail bear tiny, soft, granular scales; on the dorsum and tail, the granular scales are interspersed with enlarged, pointed tubercles. The hands and feet lack expanded digital pads and are tipped with a claw.

Lepidophyma flavimaculatum

Least concern

Yellow-spotted Tropical Night Lizard (*Lagartija Nocturna Atlántica*)

A secretive lizard of the Atlantic slope. Black with a pattern of cream or yellow polka dots. Its large head is armored with big, glossy plates, while the body, tail, and limbs are covered in small granular scales, interspersed on the dorsum and tail with enlarged, pointed tubercles. The eyes lack moveable eyelids and have a round pupil. Standard length to 4.3 in (110 mm); total length to at least 10.4 in (265 mm).

Lepidophyma flavimaculatum occurs in the Atlantic lowlands, from Veracruz, Mexico, to the Canal Zone in Panama; from near sea level to 2460 ft (750 m).

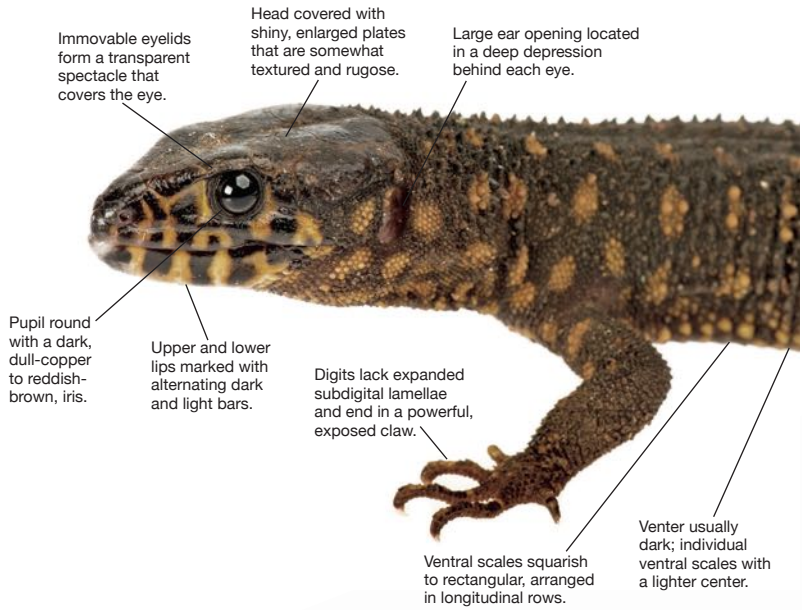
Natural history

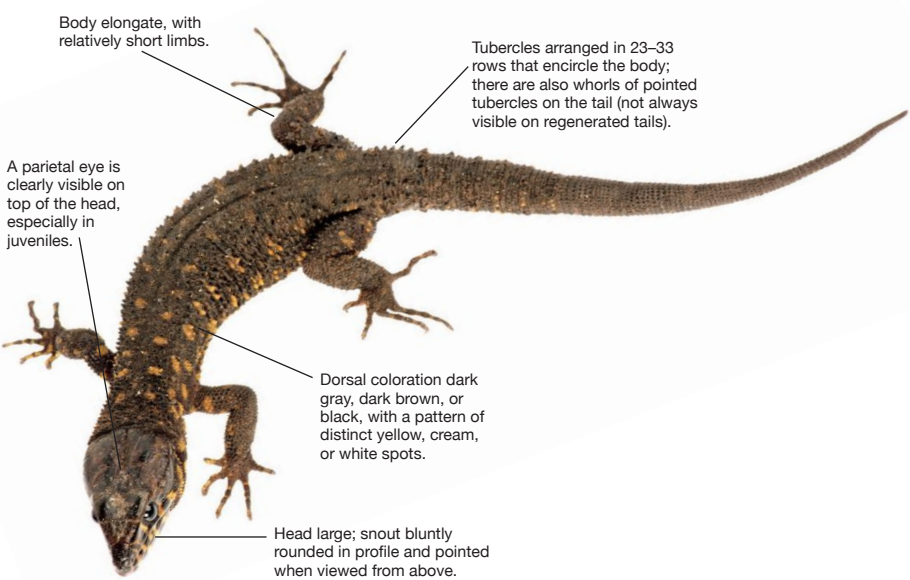
This is the most widespread species of *Lepidophyma* in Central America, but its populations are localized and often widely separated. It can be quite common in some areas but is very skittish and difficult to observe. *Lepidophyma flavimaculatum* inhabits burrows and abandoned leaf-cutter ant nests, and hides under rocks, logs, and other surface debris. It is mostly active in the early morning and late afternoon but is occasionally seen on overcast days. Individuals bask at the entrance of their burrow, usually with only the head and neck protruding, and retreat rapidly at the first sign of disturbance. These lizards appear to have an extremely small home range and never venture far from their retreat. *Lepidophyma flavimaculatum* feeds primarily on invertebrates, including significant numbers of ants and termites.

The disjunct population structure and low mobility of this species decrease opportunities for sexual reproduction. Populations from lower Central America (Panama and most of Costa Rica) consist only of females. The females of this species are capable of producing offspring without mating (parthenogenesis). All young lizards produced in this manner are females. In northern Central America, as far south as extreme northeastern Costa Rica, males are present in small numbers. Like all other members of the family Xantusiidae, *Lepidophyma flavimaculatum* is live-bearing and produces litters of up to six young during the wet season.

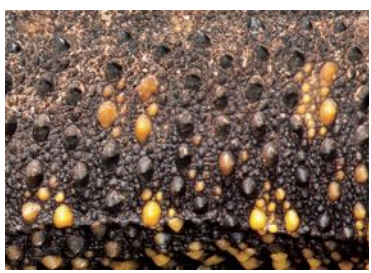
Individual *Lepidophyma flavimaculatum* are most often seen as they perch at the entrance of a burrow, with only their heavily armored head exposed.

Description





Its heavily armored head and unique scalation on the body and tail make *Lepidophyma flavimaculatum* one of the most recognizable lizards in the country.



Body, tail, and limbs covered with granular scales, interspersed with enlarged conical tubercles.

Chin and throat cream to white, sometimes with a few scattered brown specks; compare with *Lepidophyma reticulatum* (p. 293).

Similar species

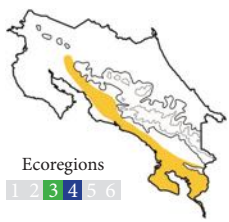
- *Lepidophyma reticulatum* (p. 292) is nearly identical but has a dark brown or black reticulated pattern with bold light spots on the throat and chin. It only occurs on the Pacific slope.

Lepidophyma reticulatum

Least concern

Reticulated Tropical Night Lizard (*Lagartija Nocturna Pacífica*)

A secretive lizard of the Pacific slope. Black with a pattern of pale yellow spots. Its large head is covered with big glossy plates, while the body, tail, and limbs are covered in small granular scales, interspersed on the dorsum and tail with enlarged, pointed tubercles. The eyes lack moveable eyelids and have a round pupil. Standard length to 4.3 in (110 mm); total length to at least 10.4 in (265 mm).



Lepidophyma reticulatum occurs locally in the lowlands and foothills of Pacific southwestern Costa Rica and adjacent Panama; from near sea level to 4100 ft (1250 m).

Natural history

A poorly known, reclusive species. It is very similar in appearance and likely also similar in biology to *Lepidophyma flavimaculatum*. Individual *Lepidophyma reticulatum* have been found hiding under logs or other cover objects, or in burrows dug into vertical road and stream banks. It appears that this species sometimes uses abandoned sections of tunnel in leaf-cutter ant colonies as a refuge. They can be seen at dusk and dawn, when they bask in the rising or setting sun. Typically, they appear with only their head and front of the body emerging from a burrow; they quickly retreat inside when disturbed. *Lepidopyma reticulatum* is insectivorous and consumes a variety of invertebrate prey, including significant numbers of ants and termites.

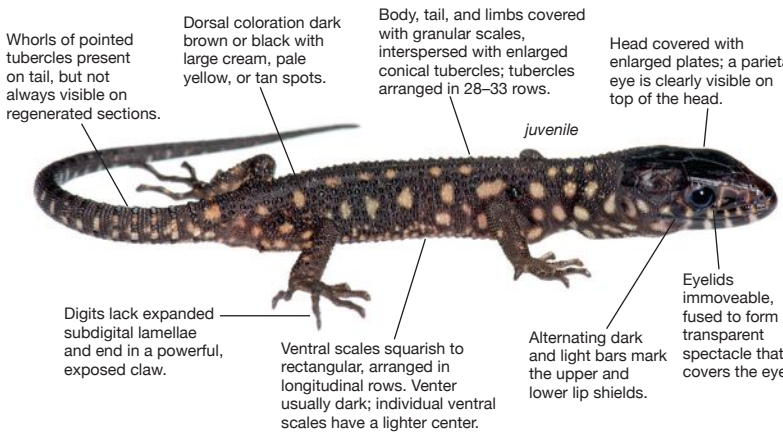
All known populations of *Lepidophyma reticulatum* consist only of females, and this species likely reproduces parthenogenetically, a reproductive strategy in which females produce only female offspring, without mating. These lizards give live birth to a small number of offspring during the rainy season.

This species inhabits humid lowlands and premontane slopes, usually in relatively undisturbed or pristine forests. However, it has been found in close proximity to human settlements and seems somewhat tolerant of habitat disturbance. Little is known about its population status, but *Lepidophyma reticulatum* appears relatively common locally.

Lepidophyma reticulatum may co-occur with *Lepidophyma flavimaculatum* in northwestern Costa Rica, just north of Tilarán, the only area in the country where the Atlantic and Pacific faunal zones meet.

Because it lacks moveable eyelids, *Lepidophyma reticulatum* cleans its eyes using its long tongue, a behavior also seen in many geckos.

Description



Similar species

- *Lepidophyma flavimaculatum* (p. 289) is nearly identical, but has a cream-colored throat that is usually marked with a few tiny brown specks; it only occurs on the Atlantic slope.

Suborder Serpentes (Snakes)

The complete absence of limbs, which is the most obvious feature of snakes, is not unique to this group of reptiles. Many types of lizards show varying degrees of limb reduction or even lack limbs, and entirely legless lizards exist in many parts of the world. Clearly there must be benefits to this morphological adaptation. The prevailing theory is that modern-day snakes evolved from a group of burrowing lizards similar to (and possibly related to) monitor lizards. In the confined spaces of burrows and tunnels, limbs are of limited use. Other characteristic adaptations shared by snakes, such as loss of external ear openings and loss of moveable eyelids (in all snakes the eyes are covered with a clear, transparent, spectacle-like scale that is renewed each time the snake sheds its skin), are also beneficial to burrowing animals. Eyelids and ear openings are a hindrance underground, since they collect sand and debris when burrowing. Alternatively, it is also possible that snake morphology is derived from swimming reptilian ancestors.

More than 3,600 species of snake are currently included in the suborder Serpentes. All are related to one another, and all snakes are also closely related to lizards (both are included in the order Squamata). When evaluating the definition of the various subgroups within snakes (infraorders, families, and subfamilies), however, experts rarely agree on how to best divide the world's snakes into meaningful phylogenetic units. Until recently, clearly definable taxonomic groups (e.g., boas, pythons, and vipers) were split off from the other snakes, leaving a large heterogeneous group of species placed in the family Colubridae. At one point that family contained more than 80% of the world's snakes. Recent attempts to clarify relations within this unwieldly group have led to several phylogenetic arrangements that break the family Colubridae into smaller, more meaningful units.

However, the exact composition of the various subgroups is continuously changing as new research becomes available. Furthermore, the decision to assign subfamily or full family status to these different groups is somewhat arbitrary, and researchers have different opinions on this matter. To complicate matters, the characters used to distinguish the various subgroups of snakes tend to be primarily differences in dentition, skeletal features, molecular sequences, or hemipenis structure, none of which are observable under field conditions.

Costa Rica is home to 141 species of snake. On the most basic level, these can be divided into 2 main subgroups: the infraorder Scolecophidia (blindsnakes) and the infraorder Alethinophidia (advanced snakes). Only 5 species of blindsnake, divided over 3 families (Anomalepididae, Leptotyphlopidae, and Typhlopidae) occur in the country; all other snakes in the country are assigned to the infraorder Aletinophidia.

The advanced snakes include well known subgroups such as the 4 types of boas (family Boidae) that occur in Costa Rica, as well as lesser known groups like the unique burrowing python (*Loxocemus bicolor*), the sole member of the family Loxocemidae, and a single species of bromeliad boa (*Ungaliophis panamensis*), of the family Ungaliophiidae. Together, these 3 families represent the primitive snakes, old clades that are located near the base of the snake phylogenetic tree. One trait that members of these 3 families share, a feature that is indicative of the age of these groups, is the presence of vestigial hind limbs and remnants of a pelvic girdle. X-rays of these species reveal residual bones that are a relic of past hind limbs. The only visible aspect of this feature is the presence of short, nail-like spurs, one on either side of the snake's vent. These pelvic spurs, or anal

TABLE 2. Taxonomic overview of Costa Rican snakes

		Common name	No. of species
	Infraorder Scolecophidia		
	Family Anomalepididae	Anomalepid snakes	3
	Family Leptotyphlopidae	Leptotyphlopid snakes	1
	Family Typhlopidae	Typhlopid snakes	1
	Infraorder Aletinophidia		
	Family Boidae	Boid snakes (true boas)	4
	Family Loxocemidae	Burrowing python	1
	Family Ungaliophiidae	Bromeliad boas	1
	Family Colubridae	Colubrid snakes	42
	Family Dipsadidae	Dipsadid snakes	63
	Family Natricidae	Natricine snakes	2
	Family Elapidae	Coralsnakes and relatives	6
	Family Viperidae	Vipers and pitvipers	17

Green = harmless, non-venomous; orange = rear-fanged, mildly venomous; red = dangerously venomous.

Costa Rican snakes display a dazzling variety of shapes and colors. Some species, like this *Scolecophis atrocinctus*, have stunningly bold coloration.

spurs, are generally more developed in males than in females and serve a role in courtship and mating. Males use these spurs to stimulate the female.

The remaining families can be divided between venomous snakes and non-venomous snakes. This distinction is somewhat arbitrary because snakes generally considered non-venomous often do produce venom (although they are not considered dangerous to humans). Nevertheless, in Costa Rica all members of two families of snake, coralsnakes and allies (family Elapidae) and vipers (family Viperidae), should be considered dangerously venomous. Costa Rican elapids include brightly colored, terrestrial coralsnakes and one seasnake. The latter is placed in a subfamily of the Elapidae called Hydrophiinae; it contains all of the world's seasnakes. All Costa Rican members of the viper family are assigned to the subfamily Crotalinae, commonly called pitvipers.

Once these easily identifiable families of snake are subtracted from the country's total snake fauna, there remain 107 species of snake that are assigned to three families, Colubridae, Dipsadidae, and Natricidae. Members of these three families are traditionally considered to be non-venomous, even though many do produce venoms. An important difference between these snakes and the members of the dangerously venomous Elapidae and Viperidae lies in the chemical make-up of the venoms, and also in their venom delivery systems. Members of the family Elapidae have hollow fangs that are connected to venom ducts, which in turn are connected to specialized venom glands, highly concentrated glands that produce and store venom. The fangs are of a proteroglyphous type, which means that the fangs are rigid, immobile, and located in the front of the mouth. Generally, these types of fangs are relatively short to allow the snake to fully close its

Pitvipers, like this fer-de-lance (*Bothrops asper*), have extremely long, hollow fangs that act much like hypodermic needles when injecting venom. The fangs articulate and fold back when the mouth is closed. Note that a second, replacement fang is located behind the primary fang; periodically fangs get replaced by new ones.

mouth without injuring the lower jaw. Proteroglyphous dentition is found in all members of the family Elapidae.

Vipers tend to have very large, hollow fangs that can hinge at their base and are folded back flat against the roof of the mouth when the snake closes its mouth. When striking, the fangs fold out and are jabbed deep into the prey to deliver the venom. All members of the family Viperidae have this dentition type (solenoglyphous), and all have specialized venom ducts and venom glands associated with their highly efficient venom delivery system.

The remaining 107 species of Costa Rican snake have one of two types of dentition. Either the teeth are entirely solid and roughly similar in size (aglyphous dentition) or the teeth are solid and mostly similar in size, except for a few greatly enlarged teeth located in the back of the mouth (opisthoglyphous dentition). These enlarged teeth may have a shallow groove to direct saliva and/or venom but are never hollow. In some snakes, the enlarged teeth at the back of the mouth are connected to a venom gland (Duvernoy's gland). At least two African opisthoglyphous species, the boomslang (*Dispholidus typus*) and the savanna twig snake (*Thelotornis capensis*), have caused human fatalities; in general ophistoglyphous snakes—including all Costa Rican species—are not considered dangerously venomous, although many species do produce mild toxins.

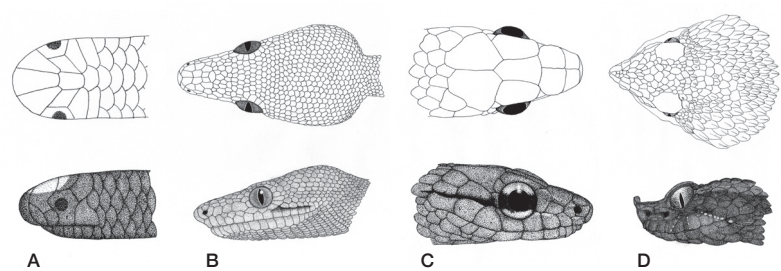
Several rear-fanged Costa Rican snakes such as the road guarder (*Conophis lineatus*) and *Coniophanes* and *Erythrolamprus* species may deliver a painful bite. No information exists on bites of some of the larger rear-fanged species such as the mussurana (*Clelia clelia*), but a bite from those species could cause serious discomfort. Since the effects of snake venom can vary from person to person, it is impossible to say which species are potentially dangerous. As a rule, it is better to avoid being bitten, and rear-fanged snakes should always be treated with care.

The family Colubridae mainly contains species with aglyphous dentition, but a few are opisthoglyphous and some are capable of producing

venom that is not considered dangerous to humans. Members of the family Dipsadidae are mostly opisthoglyphous. with enlarged rear fangs; some are venomous (but not dangerously so). The two Costa Rican species of semi-aquatic, live-bearing snakes in the family Natricidae have aglyphous dentition and are therefore harmless to humans (although bites by related species that are not present in the country have resulted in significant symptoms of envenomation).

Members of the families Colubridae, Dipsadidae, and Natricidae all have nine enlarged, symmetrical plates on the top of their head. Note, however, that this particular scale configuration also occurs in coralsnakes (family Elapidae) and cannot be used as a reliable way to distinguish dangerously venomous snakes from harmless ones.

Fig. 3. Scalation characteristics of Costa Rican snakes



A. Blindsnakes in the Infraorder Scolecophidia (families Anomalepididae, Leptotyphlopidae, and Typhlopidae) lack enlarged ventral scales; rounded scales (of equal size) completely encircle the body and tail. Head scale configuration consists of conspicuously enlarged scales that cover the snout and eyes; eyes are beneath the scales and only visible as dark spots on the side of the head (*Epictia ater* shown). **B.** Boas and allies (families Boidae, Loxocemidae, and Ungaliophiidae) have their head covered with numerous small, irregularly shaped scales, although some species may have a few larger plates mixed in (especially on the top of the snout). The body is generally robust and surrounded by a high number of scale rows (more than 20). Several species have heat-sensitive grooves between the lip scales, but they never have a heat-sensitive loreal pit, located between the eye and nostril (*Corallus ruschenbergerii* shown). **C.** With few minor exceptions, members of the harmless families Colubridae, Dipsadidae, and Natricidae —as well as the venomous coralsnakes of the family Elapidae—typically have the top of their head covered with a series of nine symmetrical and enlarged plates. Body shapes and color patterns may vary widely, but the configuration of the head scales rarely changes (*Leptophis depressirostris* shown). **D.** Pitvipers (family Viperidae) share many characteristics with the boas. They have a robust body with a high number of dorsal scale rows; small, fragmented scales on the head (sometimes with larger, asymmetrical plates mixed in); and vertically elliptical pupils, but they invariably possess a deep heat-sensitive pit on either side of the head, located roughly halfway between the eye and the nostril. These loreal pits are unique to pitvipers (*Porthidium nasutum* shown).

Blindsnakes
(Families Anomalepididae, Leptotyphlopidae, and Typhlopidae)

The term *blindsnake* is often applied to members of the families Anomalepididae, Leptotyphlopidae, and Typhlopidae, which are among the most primitive snakes in the world. Together with two additional families, Gerrhopilidae and Xenotyphlopidae, which occur in the Old World, they comprise the infraorder Scolecophidia. Costa Rica is home to three species of Anomalepididae, and one species each of Leptotyphlopidae and Typhlopidae.

These tiny snakes, referred to as blindsnakes or threadsnakes, are often considered primitive because many of their body parts appear to be rudimentary. All species have a highly modified skull, a vestigial pelvic girdle, and greatly reduced eyes. They can be recognized by the polished, rounded scales of equal size that cover their small, cylindrical body. Unlike all other terrestrial snakes in Costa Rica, the belly scales are not enlarged.

A distinguishing characteristic of blindsnakes is the rounded head with an enlarged plate on the tip of the snout. This large plate sometimes covers most of the front of the head. Their eyes are vestigial, and all species have poor vision. In some, the eyes are only barely discernible as poorly defined dark spots visible through skin and scales. Blindsnakes depend mainly on chemosensory signals for feeding, reproduction, and defense, and their perception of chemical cues is highly developed.

Blindsnakes are burrowers and are rarely seen on the surface. Little is known about their biology or distribution.

Family Anomalepididae
(Anomalepid Snakes)

This small family has 18 species of primitive blindsnake, assigned to 4 genera (*Anomalepis*, *Helminthophis*, *Liotyphlops*, and *Typhlophis*). They occur in lower Central America and in South America. Three species in 3 genera (*Anomalepis mexicanus*, *Helmintophis frontalis*, and *Liotyphlops albirostris*), all rare, are reported to occur in Costa Rica.

Anomalepid snakes are wormlike and small (total length less than 15 in [38 cm]), with smooth, round scales of equal size that completely encircle a cylindrical body. They have a burrowing lifestyle, vestigial eyes covered by skin and scales, and a skull highly modified for digging and for eating termites, their preferred prey.

All anomalepidids are thought to be egg-laying, with clutches of 2–13 eggs. In the genera *Anomalepis* and *Helmintophis*, the left oviduct is absent or vestigial, probably an adaptation to its extremely small and thin body; all other snakes have two oviducts.

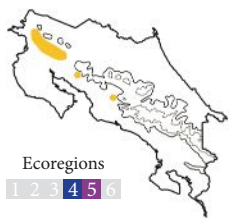
The snakes in this family differ from the other Central American blindsnakes (families Leptotyphlopidae and Typhlopidae) in having teeth on both jaws. However, features necessary to identify individual species in this family can only be seen under high magnification, or pertain to internal morphology. Field identification of these diminutive snakes is very difficult.

Anomalepis mexicanus

Data deficient

Mexican Threadsnake (*Culebra de Hilo Mexicana*)

A tiny wormlike snake with a bluntly rounded head and a short, stubby tail that ends in a terminal spine. Eyes faintly indicated, covered by head scales. Coloration uniform brown, without distinct light markings on the head or tail. Total length to 7.1 in (180 mm).

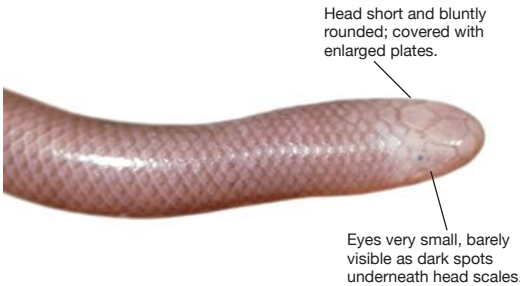


Anomalepis mexicanus is known from a few isolated records from northwestern and central Costa Rica, central Panama, and Peru. It probably also occurs in Colombia and Ecuador, but has yet to be confirmed there. From near sea level to 3370 ft (1028 m).

Natural history

Only a handful of individuals have been identified in Costa Rica. Originally it was only known from the relatively dry Guanacaste lowlands, where it had been found in leaf litter. However, additional individuals were recently found in foothills near Monteverde and in the vicinity of San José. These snakes were all discovered beneath logs or fallen trees, either in disturbed agricultural areas near regenerating forest or in areas near a stream course. *Anomalepis mexicanus* is oviparous and insectivorous.

Description



Similar species

- This is the only tiny blindsnake in the region without any lighter markings on the head, tail, or venter.
- *Epictia ater* (p. 308) is mostly uniform dark brown but has a yellow spot on the head and on the tail; it only has 14 scale rows encircling the body.
- *Helmintophis frontalis* (p. 303) has a dark brown to black body and a pink head.
- *Liotyphlops albirostris* (p. 305) has a pale spot on the head.

Helmintophis frontalis

Northern Antsnake (*Hormiguera*)

Least concern

A small, exceedingly slender wormlike snake. Has a bluntly rounded head and tail; eyes barely visible and covered by scales. Coloration distinctive: has a glossy dark brown to black body and a pink head and neck. Total length to at least 10.8 in (274 mm).

Helminthophis frontalis has been documented in Costa Rica's Central Valley and in southwestern Panama, at elevations from near sea level to 4725 ft (1440 m).

Natural history

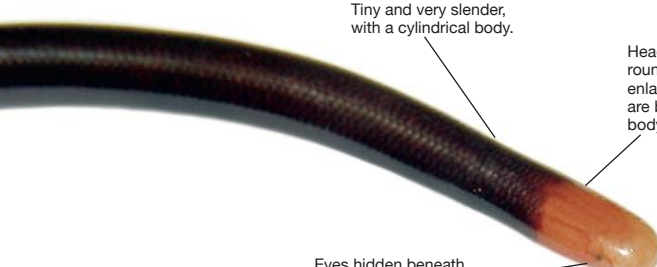
This species is poorly known and rarely seen but may be more common than current observations indicate. It is fossorial and has been found under rocks and logs, in leaf litter, and also underground, burrowing. It inhabits relatively undisturbed rainforest habitats in lowlands and foothills but has also been found in severely altered areas and even in cities. Domestic cats have been reported as predators of these tiny snakes, indicating that *Helmintophis frontalis* may be found near people's homes, but also suggesting that this species may be vulnerable to heightened predation pressure in developed areas.

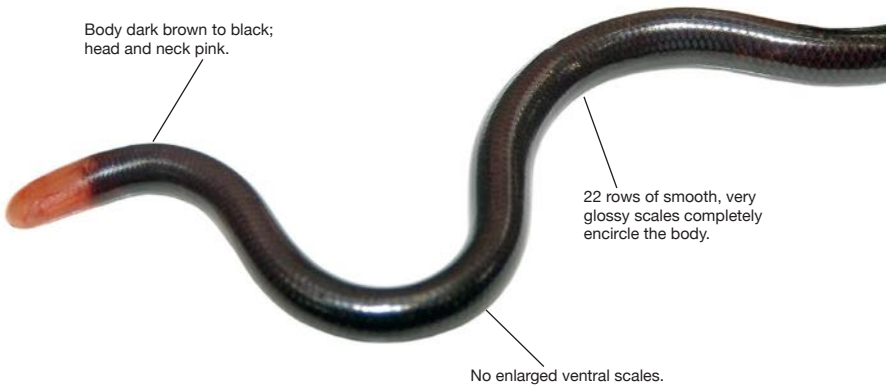
Helminthophis frontalis is insectivorous, and probably feeds on ants and termites, including their eggs and larvae. It is oviparous.

Description

470–480 dorsal scales from head to tail.

Tail very short and bluntly rounded, ending in a short terminal spine.





Similar species

- *Epictia ater* (p. 308) is mostly uniformly dark brown but has a yellow spot on the head and one on the tail; it has only 14 scale rows encircling the body.
- *Anomalepis mexicanus* (p. 301) is uniformly dark brown.
- *Liotyphlops albirostris* (p. 305) has a pale spot on the head.

Liotyphlops albirostris

Data deficient

White-snouted Slender Blindsnake (*Culebra Ciega de Nariz Blanca*)

A small, slender, wormlike snake with a bluntly rounded head and a short tail that ends in a terminal spine. Eyes, covered by head scales, are barely discernible. Coloration uniform dark brown to black, with a pale spot on the head. Total length to 8.8 in (223 mm).

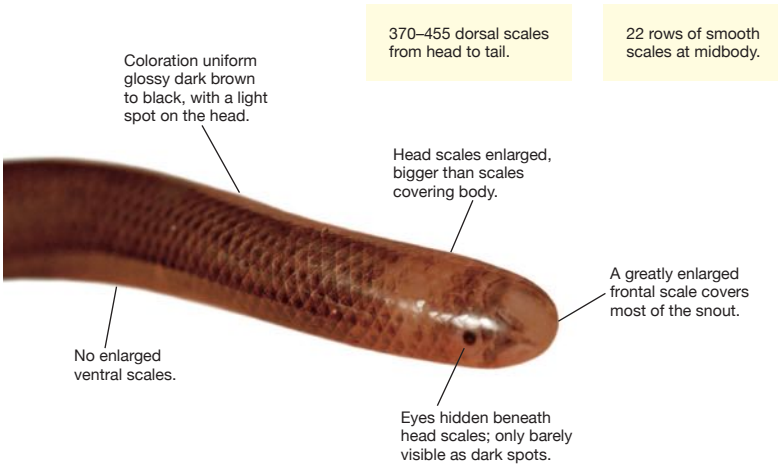
Liotyphlops albirostris occurs in western and central Panama, northwestern South America, and the Dutch Antilles. Historic collections of this species exist from Costa Rica; the exact locations of these collection sites is uncertain, though it is likely they come from the lowlands of southwestern Costa Rica. Occurs from near sea level to 5380 ft (1640 m) in areas outside Costa Rica.

Natural history

This diminutive fossorial snake inhabits the leaf litter substrate of the forest floor and also burrows underground. It feeds on small insects (most likely ants, termites, and their larvae and eggs). *Liotyphlops albirostris* is oviparous, and its eggs have been discovered incubating inside the nest of a type of fungus-growing ant. A historic specimen representing this species, currently in the collections of the Smithsonian Institute, is labeled "Chiriqui, Costa Rica." As Chiriqui is in adjacent Panama, *Liotyphlops albirostris* is expected to occur in southwestern Costa Rica, although it has yet to be confirmed in the country.

In Panama, these tiny snakes are most often encountered after heavy rains, when their burrows flood and they are forced to the surface.

Description



Similar species

- *Epictia ater* (p. 308) is mostly uniform dark brown but has a yellow spot on the head and one on the tail; it only has 14 scale rows encircling the body.
- *Helmintophis frontalis* (p. 303) has a dark brown to black body and a pink head.
- *Anomalepis mexicanus* (p. 301) is uniformly dark brown.

Family Leptotyphlopidae
(Leptotyphlopid Snakes)

Approximately 140 species in 13 genera comprise this family, which occurs in tropical and subtropical areas worldwide. These are small to very small slender blindsnakes, measuring less than 14 in (35.5 cm) in total length. They typically have a bluntly rounded head and a short, spine-tipped tail. Their eyes are covered with scales; uniformly sized scales completely encircle their body. Members of the family Leptotyphlopidae typically have 13–15 scale rows encircling the body, whereas other similar-looking blindsnakes have between 18–44 scale rows at midbody.

Members of this family are fossorial insectivores, often associated with ant and temite nests; they are oviparous.

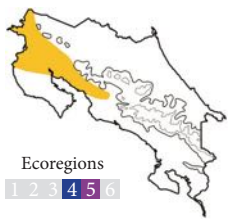
A single species, *Epictia ater*, is found in Costa Rica.

Epictia ater

Least concern

Black Threadsnake (*Culebra Hilo de Bosque Seco*)

A very slender, small snake. Has a bluntly rounded head, a short spine-tipped tail, and 14 scale rows that encircle the body. Eyes are covered with scales and only barely discernible as dark spots. Uniformly dark, with a yellow to cream spot on top of the head and another on the tail. Total length to 10.6 in (27 cm).



Epictia ater occurs in the Pacific lowlands of western Nicaragua and northwestern Costa Rica; from near sea level to 2300 ft (700 m).

Natural history

These secretive little snakes are active both day and night. Mainly fossorial, they are sometimes found by digging in soil, or by looking under logs or rocks. *Epictia ater* has been discovered inside termite nests, and on one occasion, an individual was seen climbing up a tree trunk, in broad daylight, headed toward a termite nest that was located about 3 ft (1 m) above the ground. This species is known to follow pheromone trails of army ants and may use similar chemical cues to locate termite mounds and other ant species' colonies.

Snakes of the genus *Epictia* prey exclusively on invertebrates, with ants and termites comprising the bulk of their diet. When entering an ant or termite nest, these snakes excrete a chemical substance that makes the insects accept it as a nest mate; this allows the snake to remain inside the colony without being attacked by the soldiers. When feeding on ant and termites, the snakes grab their prey by the abdomen, bite through the insect's armor, and eat the intestines.

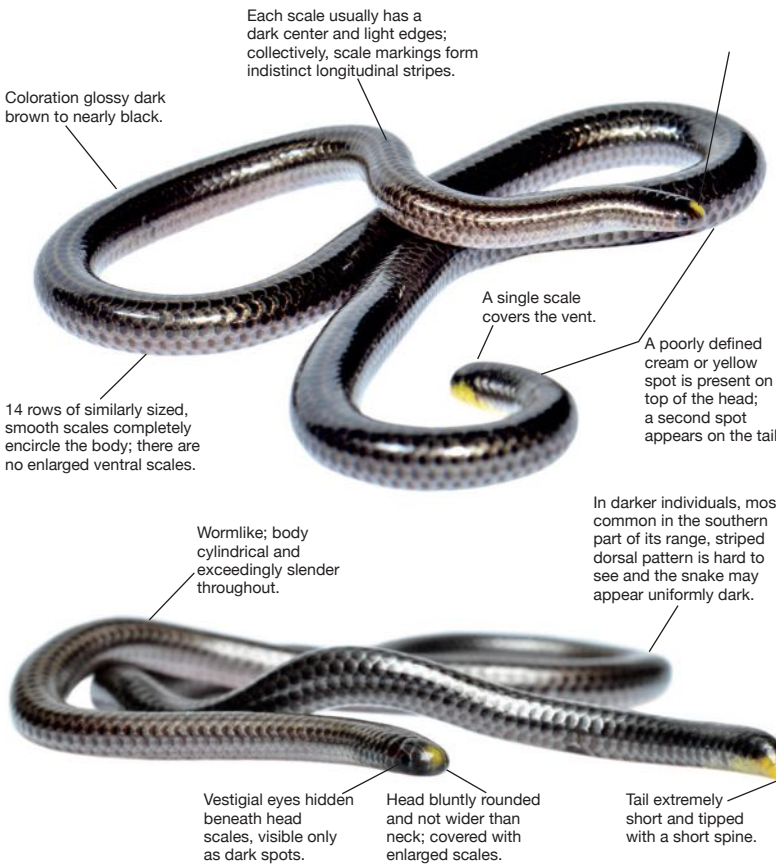
Occasionally, observers stumble across small aggregations of *Epictia ater*, sometimes accompanied by other snakes (*Enulius flavitorques* [family Dipsadidae] has been reported); the function of these aggregations still remains unknown.

In other parts of Central America, this species has been reported to produce clutches consisting of 8–12 eggs in June and July.

This species was previously known as *Leptotyphlops goudotii* or *Leptotyphlops ater*.

Because it has the same size and shape as a worm, it is easy to forget that these tiny snakes are vertebrates, with a well-developed skeleton and all the organs and other morphological features found in much larger snakes such as boas.

Description



Similar species

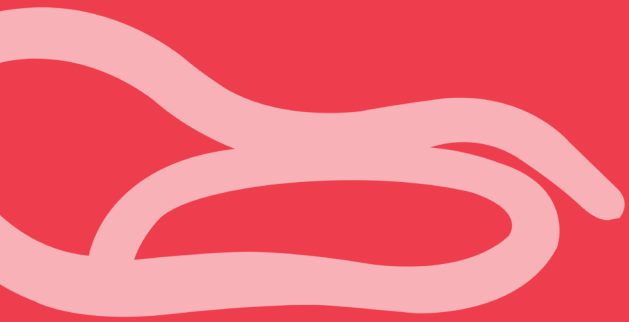
- *Epictia ater* (p. 308) differs from other blindsnakes in having only 14 scale rows encircling its body (18 or more scale rows in other genera).

Family Typhlopidae
(Typhlopid Snakes)

Members of this relatively large family (approximately 270 species in 18 genera) are found in tropical regions worldwide, and in temperate zones of Asia and Australia.

Typhlopidae have more scale rows encircling their body than do species of the family Leptotyphlopidae. In addition, typhlopids have teeth on the upper jaw only, while leptotyphlopids only have teeth on the lower jaw; all other snakes have teeth on both jaws.

A single species, *Amerotyphlops costaricensis*, occurs in Costa Rica.



Amerotyphlops costaricensis

Least concern

Costa Rican Blindsnake (*Culebra Ciega Costarricense*)

The largest blindsnake in Costa Rica. Relatively robust, with a cylindrical body, bluntly rounded head, and a bluntly rounded tail that ends in a terminal spine. Eyes covered by enlarged head scales. Uniform brown to gray, but snout and undersurfaces pale tan to cream. To 14.2 in (36 cm) in total length.

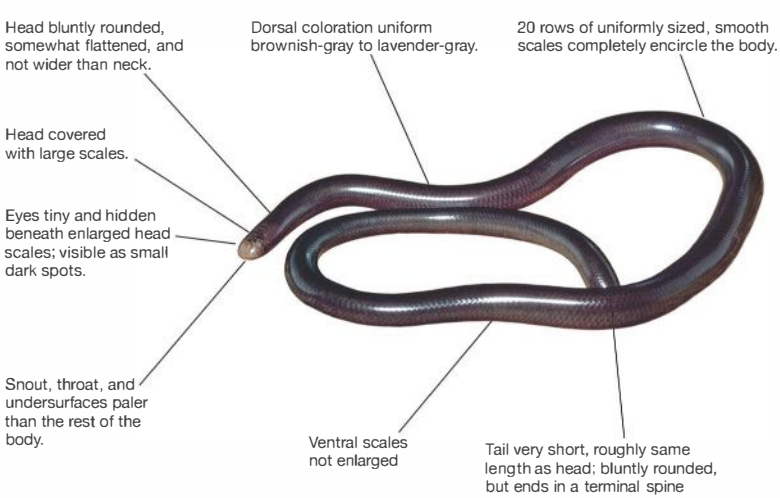
Amerotyphlops costaricensis is currently only known from isolated locations in southwestern Honduras, northern Nicaragua, and in the Monteverde region in nortwestern Costa Rica; from 3610–4920 ft (1100–1500 m).

Natural history

Amerotyphlops costaricensis resembles a large, blunt-headed, blunt-tailed worm, but its scale-covered body will immediately identify it as a reptile. Its size, shape, and color are reminiscent of caecilians, but those amphibians have glandular skin that is creased into folds, and they lack scales. Very little is known about the biology of *Amerotyphlops costaricensis*, as this species has only been observed a handful of times. Two of the known individuals were regurgitated by Central American coralsnakes (*Micrurus nigrocinctus*), and they may be an important prey item for that species. *Amerotyphlops costaricensis* is oviparous and fossorial.

This species has been included in earlier literature as *Typhlops costaricensis*.

Description



Similar species

- No other blindsnakes have 20 scale rows encircling their body. All other species have either a light-colored spot on their head, or an entirely light-colored head.
- *Anomalepis mexicanus* (p. 301) has a solid dark coloration but has 22 scale rows encircling its body.

Family Boidae
(Boid Snakes)

The family Boidae has seen many revisions in the last decades, and the exact placement of several smaller subgroups is still under debate. Madagascan boas (genera *Acantophis* and *Sanzinia*), for example, are variously considered a subfamily of the family Boidae (subfamily Sanziniinae) or a distinct family (Sanziniidae). Similar phylogenetic questions remain for other discrete subgroups currently included in the family Boidae. Currently, 33 species of true boas, those assigned to the subfamily Boinae, are found in Central and South America, and on several Caribbean islands. Although this family includes some of the largest snakes on Earth—including the giant anaconda (*Eunectus murinus*) of South America—most species are of medium size.

Boids are adapted to life in a variety of habitats, ranging from arboreal species that inhabit jungle treetops to semi-aquatic species that live in swamps and rivers. They are primarily sit-and-wait predators; rather than moving through vegetation in active search of prey, they wait to ambush it. Boids are generally rather docile snakes, and even when they are approached they are not inclined to defend themselves. However, this disposition varies from individual to individual, and some will hiss loudly, coil their neck in an S-shaped curve, and sometimes even strike. All boids are non-venomous constrictors, but they have many needle-like curved teeth and great constricting power. Large individuals should be treated with care.

The living representatives of the family Boidae are primitive snakes, as attested to by the presence of a vestigial pelvis and rudimentary hind limbs. These limb remnants are visible as nail-like spurs, one on each side of the vent. The spurs are usually more developed in males than in females and are used during courtship to stimulate the female. As far as is known, all boids are live-bearing.

Members of the family Boidae share several characteristics with the pitvipers. Boas and pitvipers are heavy-bodied snakes with a triangular head; both also have a high number of scale rows that encircle the body, and numerous small scales on the top of the head. Boids, however, lack the two pitlike heat-sensitive organs, the loreal pits, that characterize pitvipers. While some boids such as *Corallus* and *Epicrates* species do have a series of heat-sensitive organs, these appear as small slits in, or between, the lip shields, never as a deep hole between the eye and nostril.

Four species of boid occur in Costa Rica. The most commonly seen, and the most familiar to popular consciousness, is the Mesoamerican boa constrictor, *Boa imperator*, which is widespread throughout the country's lowlands and foothills. Two species of arboreal boa, the Pacific tree boa (*Corallus ruschenbergerii*) and the annulated tree boa (*Corallus annulatus*), are found in the southern Pacific and Atlantic lowlands, respectively. The Central American rainbow boa (*Epicrates maurus*) is infrequently found in scattered lowland localities.

Boa imperator

Least concern

Mesoamerican Boa Constrictor (*Boa, Béquer*)

The largest, heaviest snake in Costa Rica; body robust and cylindrical, tail short, and head distinctly wider than neck. Head covered with uniformly small scales; there are no visible heat-sensitive pits in the lip shields. Scales on head, body, and tail small, smooth, and iridescent. Maximum known total length is 175.2 in (445 cm), but in nature it rarely exceeds 118 in (300 cm).

Boa imperator was previously considered *Boa constrictor* (equivalent to the former subspecies *Boa constrictor imperator*). It ranges from Sonora and Tamaulipas, Mexico, southward along both coasts of Central America into northwestern South America. In Costa Rica, it occurs from near sea level to 5165 ft (1575 m).

Natural history

Boa imperator is a common nocturnal snake that is occasionally seen active during the day. It hunts both on the ground and in trees; individuals generally retreat into animal burrows when not active. A habitat generalist, this iconic species can be found in relatively undisturbed forests but is also frequently seen in cultivated areas and farm land, as well as near, and in, homes and other man-made structures. It is tolerant of a wide range of temperature and humidity levels, and appears to be as common in the hot, dry lowlands of Guanacaste as it is in the wet foothills of the Atlantic slope.

Boas are sit-and-wait predators; they select a spot where suitable prey may pass, often near the entrance to a mammal burrow, for example, and wait. Individuals sometimes sit in the same strategic spot for two or more consecutive days before moving to another ambush site. Usually, these ambush sites are within a short distance from one another. Their prey includes iguanas and other lizards, a variety of birds, and mammals. Prey size is largely dependent on the size of the snake; juvenile *Boa imperator* may feed on rats, mice, bats, and squirrels, while larger individuals will routinely take opossums, coatimundis, monkeys, and vested ant-eaters. Very large individuals have been reported eating ocelots and young white-tailed deer.

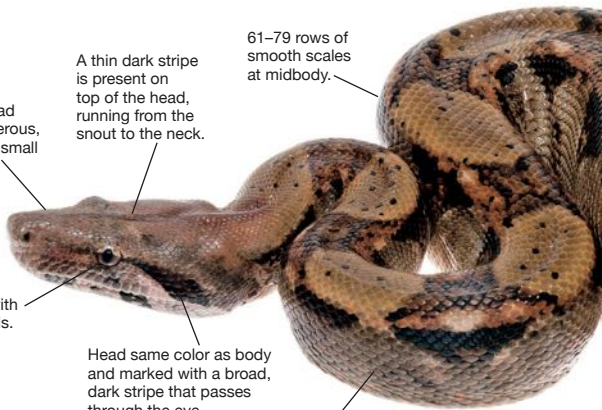
Prey is hunted by sight, chemical cues, and by tracking the prey's heat signature. Although this species does not have externally visible labial pits, it does have a concentration of extremely sensitive nerve endings located inside the lip scales. These sensory organs allow *Boa imperator* to register slight changes in temperature, which is extremely useful in hunting warm-blooded prey at night.

Boas and other primitive constrictors have a bony spur on each side of the vent, a vestigial remnant of the hind limbs and pelvic girdle that ancestors of *Boa imperator* once possessed. These pelvic spurs, which are more developed and larger in males than they are in females, are used during courtship to stimulate the female. Boas are live-bearing and give birth to large litters of up to 60 young; increased sightings of *Boa imperator* often coincide with birthing times, when people in the countryside may suddenly start finding several juveniles around the house. Generally, the young will disperse into the surrounding landscape within days. A recent case of parthenogenesis in *Boa imperator*, where a female individual gave virgin birth to all-female offspring, hints at how much we still have to learn about these fascinating snakes.

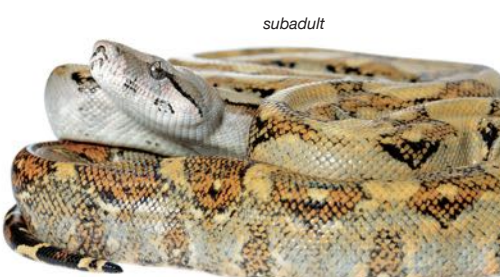
Although boas are not generally dangerous, it is worth noting that wild *Boa imperator* often have parasites and other maladies not present in captive pet snakes. While captive individuals are generally quite docile, wild boas may be irascible and some will bite readily. Adult *Boa imperator* have over 100 recurved teeth in their mouth, and each can measure more than 0.5 in (12 mm) in length; such individuals are capable of inflicting a very painful bite. It is best to never underestimate the strength of a full-grown boa, and large individuals should be treated with considerable care.

Description

Ventral scales number 225–258; has 48–70 single subcaudals.



Dentition aglyphous; all maxillary teeth are similar in size.



Juvenile *Boa imperator* have a lavender-gray body with a faint version of the adult pattern. Their colors gradually transition into the various shades of brown seen in adults, as is shown in this subadult individual.

Similar species

- *Epicrates maurus* (p. 321) has visible labial grooves and some enlarged shields on the top of the head.
- *Corallus* species (pp. 317–320) have a more compressed body, a prehensile tail, visible labial grooves, and several enlarged shields on the top of the head.

Corallus annulatus

Vulnerable

Annulated Tree Boa (*Boa Arborícola Anulada*)

A large arboreal constrictor with a slender, compressed body; a long prehensile tail; and a large head that is distinctly wider than the neck. The head is covered with small, fragmented scales, except for a cluster of enlarged plates on top of the snout. Lip shields bear clearly discernible heat-sensitive grooves. Found only in the Atlantic lowlands. Total length to 65 in (165 cm).

Corallus annulatus occurs in isolated localities along the Atlantic lowlands of Central America, from eastern Guatemala to northern Colombia; near sea level to 2130 ft (650 m).

Natural history

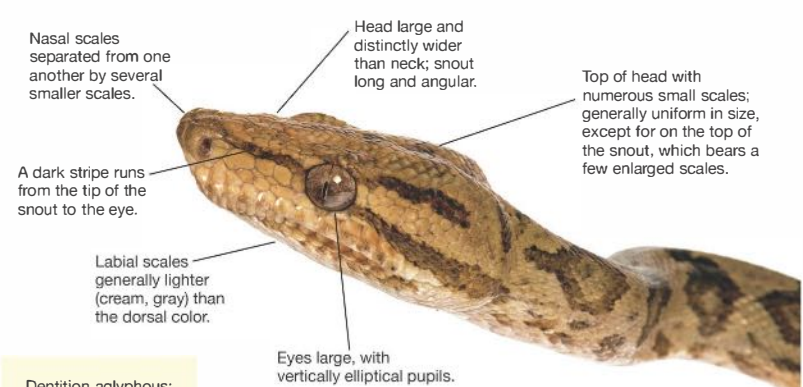
Because of its nocturnal and arboreal habits, *Corallus annulatus* is infrequently seen. It prefers relatively undisturbed lowland rainforest habitat, where it has been seen 5–125 ft (1.5–40 m) above the ground. Adults prefer the high canopy.

These snakes hunt actively at night; they seem to prefer small mammals, including bats, but also hunt sleeping birds and lizards. Prey is caught with a quick strike and constricted. Heat-sensitive grooves located between the lip scales aid in locating warm-blooded prey in the dark of night.

Corallus annulatus is not venomous but has many long, needle-like teeth and may bite in defense; bites by these powerful arboreal snakes can be painful.

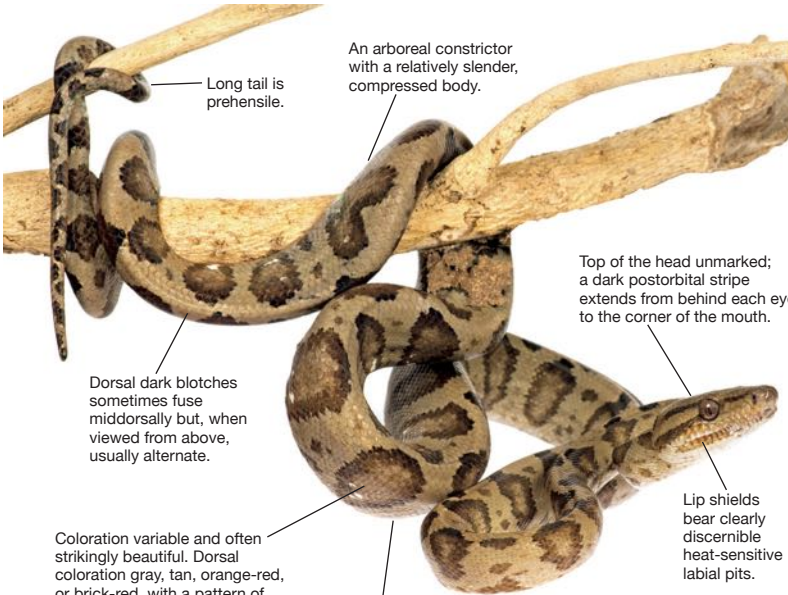
This is a live-bearing species that produces litters of up to 13 young that are generally born between July and November, after a prolonged gestation period that may last 6–7 months.

Description



Dentition aglyphous; front maxillary teeth very long, fanglike.

Description



Ventral scales number 252–269; 80–88 subcaudals in a single row.

Large individuals of *Corallus annulatus* often have orange-red or brick-red tones in their dorsal coloration; they are invariably marked with a pattern of light-centered ocelli.

Similar species

- *Corallus ruschenbergerii* (p. 319) is restricted to the Pacific slope; it has a long tail that can be nearly uniformly black. Its nasal scales are in direct contact with one another.
- *Boa imperator* (p. 321) is larger, with a cylindical body and only small scales on top of the head.
- *Epicrates maurus* (p. 315) has shallow labial grooves and a cylindrical body.

Corallus ruschenbergerii

Least concern

Pacific Tree Boa (*Boa Arborícola Norteña*)

A large arboreal constrictor with a slender, compressed body; a long prehensile tail; and a large head that is distinctly wider than the neck. The head is covered with small, fragmented scales, except for a cluster of enlarged plates on top of the snout. Lip shields bear clearly discernible heat-sensitive grooves. Found only in the Pacific lowlands. Total length to 78.7 in (200 cm).

Corallus ruschenbergerii occurs in the Pacific lowlands of southwestern Costa Rica and western Panama, and, from there, continues on both slopes of central and eastern Panama into South America, east of the Andes; from near sea level to 650 ft (200 m).

Natural history

The compressed body shape and prehensile tail of *Corallus ruschenbergerii* are adaptations to life in trees; individuals are usually seen coiled on a branch during the day or moving slowly through vegetation at night. Although most observations take place relatively close to the ground, these snakes can be found at considerable heights in the treetops. *Corallus ruschenbergerii* is most commonly seen in edge situations, especially in trees along the edges of streams. Birds were long assumed to be its preferred prey, because the long, needle-like teeth in the front of the mouth seem ideal for gripping through a thick layer of feathers. Observations on the feeding behavior of these snakes, however, revealed that they mainly prey on lizards, mouse opossums, and other small, arboreal mammals.

Given its large size, *Corallus ruschenbergerii* is capable of overpowering large lizards, including adult green iguanas (*Iguana iguana*) and adult basilisks (*Basiliscus* sp.), which are taken at night as they sleep. They may also eat bats and sleeping birds.

This species is sometimes irritable and, when approached too closely, may coil the neck and the front of the body into an S-shaped curve and strike at the intruder. This is a non-venomous constrictor, but because of its long teeth and considerable strength, it is capable of inflicting painful bites.

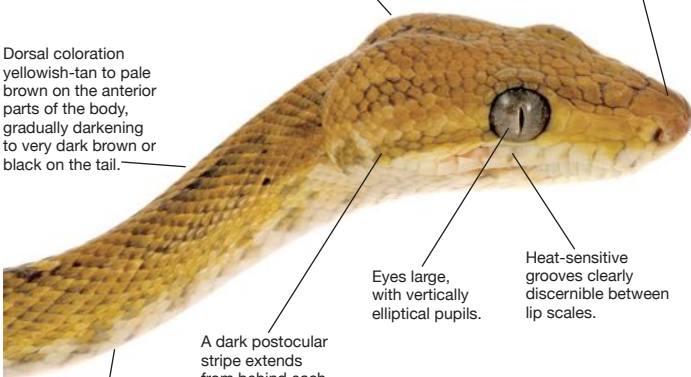
Corallus ruschenbergerii is live-bearing and produces litters of up to 30 young, which are generally born between May and August.

The two species of Costa Rican *Corallus* are geographically separated; even though details in scalation and color pattern readily distinguish the two, geographic provenance alone generally results in a positive identifcation.

In some literature, this species is referred to as *Corallus hortulanus*.

Corallus ruschenbergerii is similar to *Corallus annulatus* in appearance and biology, but typically has a dark brown or black tail. The two species are geographically separated.

Description



Top of head with numerous, small scales, generally of the same size, except for on top of the snout, which has a cluster of enlarged plates.

Head large and distinctly wider than neck, with a long and angular snout.

Dorsal coloration yellowish-tan to pale brown on the anterior parts of the body, gradually darkening to very dark brown or black on the tail.

Nasal scales in direct contact with one another.

Heat-sensitive grooves clearly discernible between lip scales.

Eyes large, with vertically elliptical pupils.

A dark postocular stripe extends from behind each eye to the corner of the mouth.

Ventral surfaces white to cream, with irregular brown blotches.

A pattern of faint dark brown to gray diamond-shaped blotches is present on the lateral surfaces; blotches often have a light center.

A constrictor with aglyphous dentition, although front teeth in the upper jaw are enlarged to fanglike proportions.

Body relatively slender and distinctly compressed. Long tail is prehensile. Individuals are generally found with their tail anchored onto branches in low vegetation and the body coiled, awaiting suitable prey to pass within striking distance.

Similar species

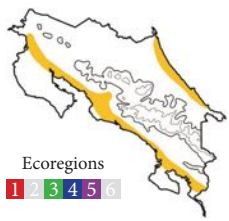
- *Corallus annulatus* (p. 317) is restricted to the Atlantic slope; it has a relatively short tail marked with dark blotches. Its large nasal scales are separated from one another by several small scales.
- *Boa imperator* (p. 315) is larger and more robust, with a cylindical body and only small scales on top of the head.
- *Epicrates maurus* (p. 321) has shallow labial grooves and a cylindrical body.

Epicrates maurus

Least concern

Central American Rainbow Boa (*Boa Arcoiris*)

A large, robust constrictor with a cylindrical body. Its scales have a distinctly glossy, rainbowlike iridescence. Head covered with small, fragmented scales. Upper lip shields bear clearly visible heat-sensitive labial pits. Total length generally to about 59 in (150 cm) but may reach 98.4 in (250 cm).



Epicrates maurus occurs from northwestern Costa Rica on the Pacific slope, and from central Costa Rica on the Atlantic slope, southward through Panama and into northern South America (western Ecuador, Colombia, Venezuela, and northern Argentina). From near sea level to at least 3935 ft (1200 m).

Natural history

Compared to its South American relatives, *Epicrates maurus* is a relatively drab snake as an adult. The iridescent, multicolored shine on its glossy scales is nevertheless quite striking, and these beautiful snakes are therefore often referred to as "rainbow boas."

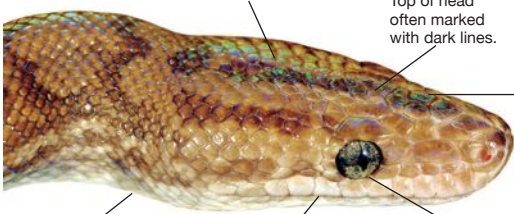
Epicrates maurus is an infrequently observed species in Costa Rica and is known from just a few isolated locations. Interestingly, in areas where it does occur, this can be a fairly common snake. It is unclear why certain areas seem to support sizeable populations of *Epicrates maurus*. It inhabits relatively open, dry areas, although it has also been found in humid forest habitats. This species is somewhat tolerant of habitat alteration and it is occasionally found in disturbed areas such as agricultural fields, or while crossing roads.

These snakes are nocturnal and mostly terrestrial, but they do climb when hunting for small mammals, birds, reptiles, and possibly frogs. They reportedly also raid bird nests, and eat their eggs. *Epicrates maurus* has heat sensitive grooves associated with the enlarged scales on the upper lip. These sensitive organs aid in locating warm-blooded prey at night.

This species is live-bearing, with litters up to 29 young reported. Gestation may take 4–5 months, and young are generally born between March and July. Interestingly, a recent study described the occurrence of several consecutive virgin births from a captive female *Epicrates maurus* that had never been exposed to a male; the offspring from these births were all female. Parthenogenesis in snakes is an exceedingly rare phenomenon that was recently also confirmed for *Boa imperator*. Perhaps facultative parthenogenesis allows snakes that occur in low densities and in isolated populations to maintain viable population sizes, and this phenomenon may be more widespread than currently thought. More research is certainly needed to assess this situation.

Previously, *Epicrates maurus* was considered a subspecies of the Amazonian rainbow boa, *Epicrates cenchria*; it is therefore listed in some older literature as *Epicrates cenchria maurus*.

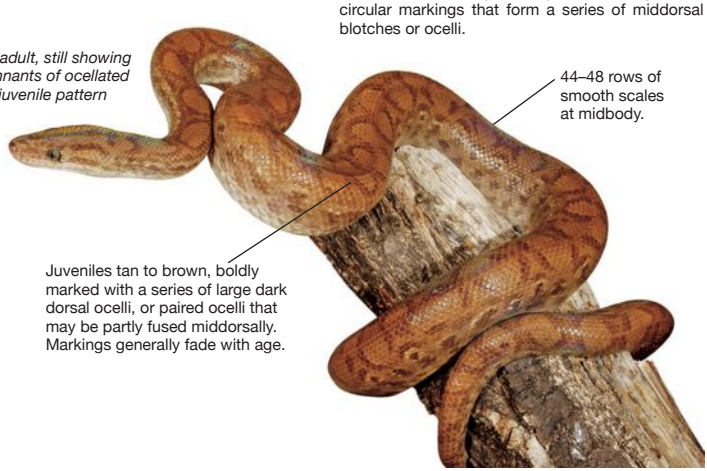
Description



Dentition aglyphous; all maxillary teeth similar in size.

Large adults brown to reddish-brown; uniform or with faint traces of juvenile pattern of large, dark circular markings that form a series of middorsal blotches or ocelli.

Ventral scales number 225–245; 47–58 subcaudals in a single row.



Similar species

- Other boids with labial grooves (*Corallus* species) have a compressed body, not a cylindrical one.
- *Boa imperator* (p. 315) is also a large constrictor with a cylindrical body, but it lacks visible labial pits or grooves.
- *Ungaliophis panamensis* (p. 327) is marked with a series of light-bordered, dark triangular spots that alternate on either side of the body's midline.

Family Loxocemidae
(Burrowing Python)

This family contains a single species, *Loxocemus bicolor*. It shares many characteristics with primitive boids, but its exact taxonomic placement has been controversial historically. Some authors considered this form to be the only representative of the family Pythonidae in the New World, which gave rise to the common name “burrowing python.” Until fairly recently, *Loxocemus bicolor* was included in the family Boidae, but it is now thought to be even more primitive than all contemporary boas. It has therefore been removed from that family and placed in its own.

Loxocemus bicolor

Burrowing Python (*Pitón Excavador*)

Least concern

A medium-sized, muscular snake with a distinctly upturned snout, a markedly two-toned color pattern (dark upper surfaces and a light belly), and a large number (30+) of smooth, iridescent scale rows at mid-body. Total length to at least 59.1 in (150 cm), but generally smaller.

Loxocemus bicolor occurs along the Pacific slope of Central America, from southern Mexico to northwestern Costa Rica, as well as in a few isolated localities on the Atlantic slope of Mexico, Honduras, and Guatemala; from near sea level to 1640 ft (500 m).

Natural history

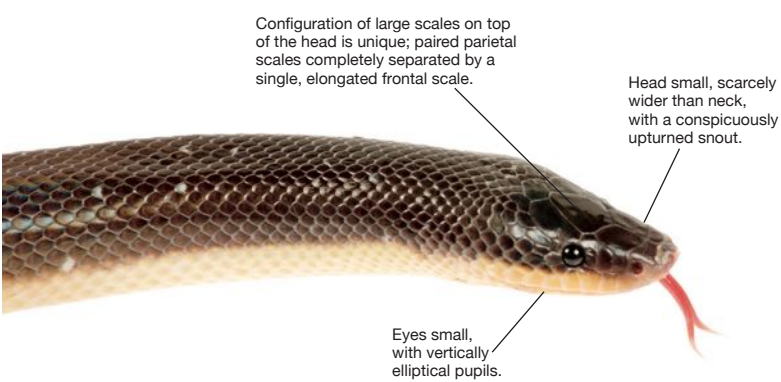
This unique, primitive snake shares some characteristics with members of the family Boidae, such as the presence of vestigial hind limb and pelvic bones visible externally in males as a pair of short spurs, located on either side of the vent. It differs most notably in having enlarged plates on the top of the head and in being oviparous.

This powerful snake is fossorial and is adept at burrowing; nevertheless, it is most commonly observed when it is active on the surface and it is usually found hidden in leaf litter, or as it crosses roads at night. It is primarily nocturnal, but individuals have also been seen foraging during the day.

Loxocemus bicolor feeds on small mammals and lizards and is also known to prey on the eggs of lizards (*Ctenosaura*, *Iguana*, *Sceloporus*) as well as sea turtles (*Lepidochelys olivacea*). The snake uses its upturned snout to burrow, and it has been observed entering tunnels leading to *Iguana* and *Ctenosaura* nests to eat the eggs, which are swallowed whole.

Although it is known to lay eggs, the reproductive behavior of wild *Loxocemus bicolor* is still poorly known. In captivity, these snakes take several years to mature and may live for more than 20 years. Males engage in combat over females and often bite each other during such interactions.

Description



Ventral scales number 252–270; 44–52 paired subcaudals; cloacal scute is divided.

Dorsal scales smooth and highly iridescent.

A large number (31–35) of scale rows at midbody.

Stocky, with a cylindrical body and very short tail.

Coloration uniquely two-toned; dorsal surfaces dark grey to deep purplish-brown; sometimes marked with small, irregular white spots. Ventral surfaces cream or white.

A pelvic spur is present on either side of the divided cloacal scute; small and barely visible in females, but more prominent in adult males.

Rather than biting in defense, *Loxocemus bicolor* usually curls its body into a tight coil and hides its head in the center. The muscular body coils provide an effective shield against predators.

Similar species

- No other Costa Rican snake combines a similar two-toned color pattern, an upturned snout, and more than 30 dorsal scale rows.

Family Ungaliophiidae
(Bromeliad Boas)

This is a small family of primitive snakes consisting of only three species that were previously included in the family Boidae. One species, *Exiliboa placata*, is endemic to Mexico, while two species of *Ungaliophis* (*Ungaliophis continentalis* and *Ungaliophis panamensis*) occur in Mesoamerica. All three species are small, stocky nocturnal forms that feed on reptiles and amphibians and are live-bearing.

Only one species, *Ungaliophis panamensis*, occurs in Costa Rica.

Ungaliophis panamensis

Least concern

Southern Bromeliad Boa (*Boa de las Bromelias*)

A small, stocky snake with small, fragmented head scales and a unique pattern of light-outlined, dark triangular spots that alternate along the dorsal midline. Total length to 26.4 in (67 cm).

Ungaliophis panamensis is known from isolated localities in the lowlands and foothills of both slopes, from extreme southeastern Nicaragua and northwestern Costa Rica southward, through Panama and into western Colombia; from near sea level to about 4925 ft (1500 m).

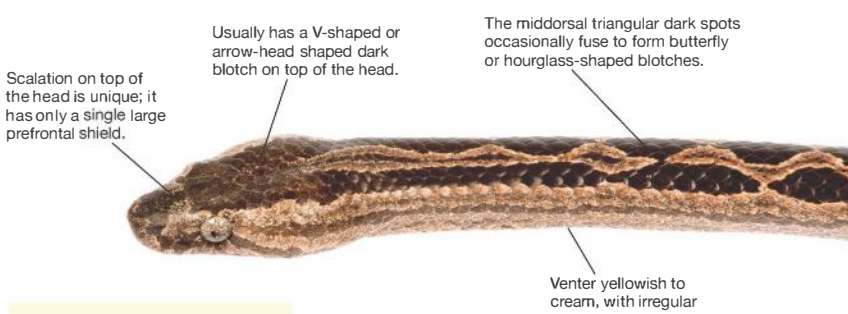
Natural history

Ungaliophis panamensis is a rarely seen nocturnal snake. It is likely more common than current observations suggest, but this canopy dweller can be difficult to observe by earth-bound observers. It inhabits arboreal bromeliads and other epiphytic vegetation on branches in the high canopy of primary moist and wet forests. However, individuals have also been found on the forest floor, under a log near the beach, and even in urban yards and suburban homes. Based on its apparent tolerance for a wide variety of habitats, *Ungaliophis panamensis* is likely quite adaptable and not terribly rare, just secretive and difficult to see.

This species' diet includes lizards and frogs, and in captivity it also accepts small mammals; prey is killed through constriction (this species is not venomous); one interesting report describes two *Ungaliophis panamensis* eating traffic-killed frogs off the surface of a road at night. This observation corroborates the perceived adaptability of this species.

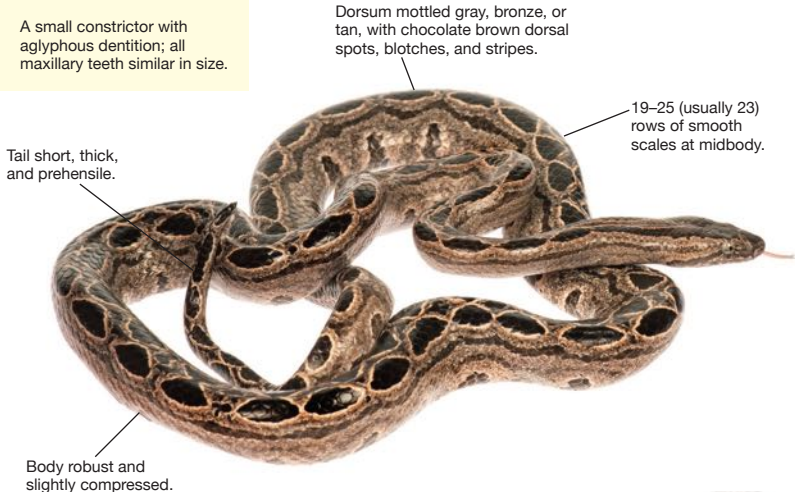
Ungaliophisis panamensis is live bearing and reported to give birth to litters of 5 or 6 young at the onset of the dry season (December and January).

Description

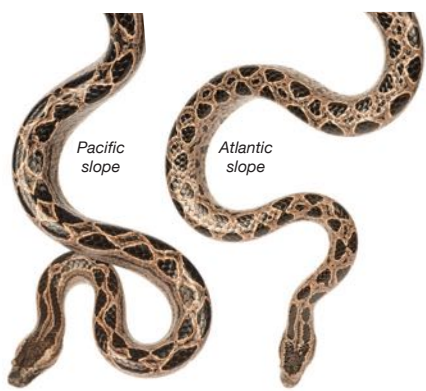


Ventral scales number 237–254; 41–48 paired subcaudals; cloacal scute undivided.

A small constrictor with aglyphous dentition; all maxillary teeth similar in size.



Pelvic spurs present on either side of the vent, well-developed in males, usually not visible in females.



Individuals on the Pacific slope have more densely clustered triangular markings than those on the Atlantic slope, whose dorsal markings are more rounded and spaced farther apart.

Similar species

- *Corallus annulatus* (p. 317) and *Corallus ruschenbergerii* (p. 319) are larger and have a distinctly compressed body, a wide head, and heat-sensitive labial grooves.
- *Epicrates maurus* (p. 321) is larger, with either a uniform iridescent brown coloration or a dorsal pattern of dark circles; it has visible labial grooves.

Family Colubridae
(Colubrid Snakes)

The newly configured family Colubridae is thought to contain at least 700 species of snake that are distributed virtually worldwide. This exceedingly diverse family includes species of varying shapes, sizes, feeding habits, habitat preferences, and activity patterns. At present, 42 Costa Rican snakes are assigned to this family.

Members of the family Colubridae share a number of characteristics with those of the related family Dipsadidae. Both have 9 enlarged, symmetrical plates on the top of the head; round or vertically elliptical pupils; and scales that are smooth or keeled. Costa Rican colubrids and dipsadids are oviparous.

Members of the family Colubridae mainly have aglyphous dentition; each tooth is solid and similar in size to the other teeth. Among such non-venomous colubrids are the racers, coachwhips, ratsnakes, milksnakes, and parrot snakes. However, a few Costa Rican colubrids are opisthoglyphous and have enlarged rear fangs. These species are capable of injecting a mild venom but are not dangerous to humans. Such rear-fanged species include the vine snakes (genus *Oxybelis*), scorpion-eaters (genus *Stenorrhina*), crowned snakes (genus *Tantilla*), and the lyre snake (*Trimorphodon quadruplex*).

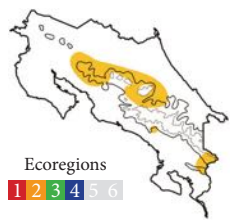
This family also includes some of the larger constrictors in the country (e.g., *Chironius grandisquamis, Drymarchon melanurus*, *Lampropeltis abnorma*, *Lampropeltis micropholis, Phrynonax poecilonotus*, and *Spilotes pullatus*), as well as other common species like the parrot snakes (genus *Leptophis*) and vine snakes (genus *Oxybelis*). Colubrid species that use venom to subdue their prey tend to be small (*Tantilla* spp., for example) or exceedingly thin (*Oxybelis* spp.) and therefore lack the physical strength to safely overpower their prey. In addition, *Tantilla* and *Stenorrhina* species feed on potentially dangerous prey (venomous centipedes and scorpions, respectively) and benefit from having the chemical means to incapacitate their prey to avoid getting hurt in the capture.

Chironius exoletus

Least concern

Green Keelback (*Serpiente de Látigo Verde*)

A slender green snake with a long tail; the body is somewhat triangular in cross-section. Dorsal scales appear in 12 obliquely arranged rows. Scales large and smooth, except for paravertebral scales, which bear strong keels and form a distinct middorsal ridge. Total length to 63.8 in (162 cm).



Chironius exoletus ranges widely along both slopes, from northern Costa Rica to eastern Brazil and northeastern Argentina; primarily at middle elevations, 985–7120 ft (300–2170 m).

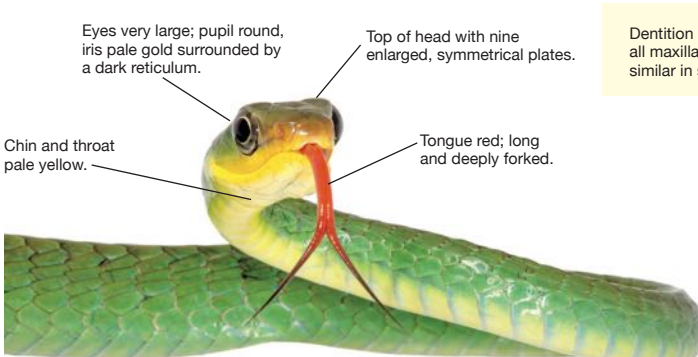
Natural history

This is an uncommon species of lowland and premontane moist and wet forests. *Chironius exoletus* is active during the day, usually seen moving about the forest floor, although it sometimes climbs into low bushes in search of prey. These large-eyed, fast-moving snakes are active hunters who rely on sight to track prey; they primarily search for tree frogs of the family Hylidae (other frogs, lizards, and salamanders have also been reported as prey items). Reportedly, *Chironius exoletus* can ingest tree frogs of the genus *Trachycephalus*. These large frogs secrete a sticky, noxious milky secretion from their skin, and Costa Rican *Trachycephalus typhonius* are know to thwart snake predation by covering the head of the attacking snake with this substance. It is not known whether *Chironius exoletus* has any specific ability to bypass these defenses, or whether it is not affected by the chemical properties of the frog's secretions.

At night, these snakes ascend into small trees and bushes and sleep coiled on vegetation, generally 5–12 ft (1.5–4 m) above the ground.

Chironius exoletus is oviparous; clutches of up to 12 eggs have been recorded.

Description



Dentition aglyphous; all maxillary teeth similar in size.

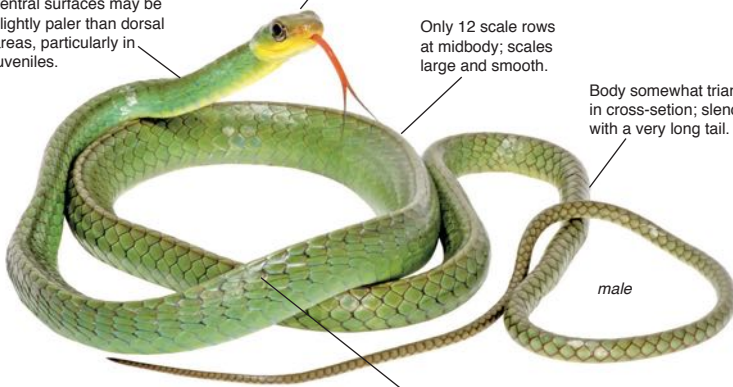
Description

Head distinctly wider than neck.

Adults bright leaf-green; ventral surfaces may be slightly paler than dorsal areas, particularly in juveniles.

Only 12 scale rows at midbody; scales large and smooth.

Body somewhat triangular in cross-setion; slender, with a very long tail.



male

Paravertebral scales keeled, more pronounced in males than in females. These scales form a distinctly raised, hard keel in males, a pair of middorsal ridges in females.

female

Ventral scales number 132–154; 133–152 paired subcaudals; cloacal scute divided.

Skin between scales has a zebralike pattern, with altenating black and white crossbands. Visible when skin is stretched taut in adults but may apear as a pattern of dark crossbands in some juveniles.

Similar species

- *Chironius flavopictus* has 12 dorsal scale rows. Note yellow venter and brown dorsum; often has a pale middorsal stripe.
- *Drymobius melanotropis* (p. 353), *Leptophis* species (pp. 363–373) and other slender fast-moving green snakes have an odd number of dorsal scale rows.

Chironius flavopictus

Data deficient

Yellow-spotted Keelback (*Serpiente de Látigo Quillada*)

A slender, fast-moving snake. Dorsum grayish-green to brown, undersurfaces yellow. Scales very large, arranged in only 12 rows around midbody; smooth, except for strongly keeled paravertebral scale rows. Total length to 78.7 in (200 cm), but generally considerably smaller.

Chironius flavopictus ranges from southern Costa Rica on both slopes, southward to western Ecuador and Colombia; from near sea level to 1475 ft (450 m).

Natural history

A fairly uncommon snake. It is fast-moving and strictly diurnal. *Chironius flavopictus* is generally found in relatively undisturbed habitats, especially near stream courses, but it does occur in disturbed habitats as long as sufficient tree cover persists. At night, these snakes climb into bushes and small trees and sleep coiled on vegetation, usually several yards/meters above the ground.

Like other species in its genus, *Chironius flavopictus* feeds primarily on amphibians; a variety of terrestrial frogs, as well as several arboreal tree frogs, have been recorded as prey. These snakes will also occasionally eat lizards. Members of the genus *Chironius* are non-venomous. They usually swallow their prey alive, although large prey may be constricted first.

These snakes tend to rapidly flee out of sight and are infrequently seen. When threatened, they put on an impressive defensive display, hissing loudly, raising their head off the ground, and sometimes spreading the neck region to form a hood and expose the light-colored skin between the scales. Often, the tail is whipped back and forth during a defensive display. When pressed further, they will readily bite.

Chironius flavopictus is oviparous and can produce clutches of at least 10 eggs at a time.

Costa Rican examples of this species were previously thought to belong to the wide-ranging species *Chironius carinatus*, but in 2006 they were re-classified as *Chironius flavopictus*. In publications pre-dating 2006, it is referred to as *Chironius carinatus* or *Chironius carinatus flavopictus*.

Description

Chironius flavopictus has a body that is somewhat triangular in cross-section and a very long, whiplike tail. Some larger adults have a pale yellow middorsal stripe that is bordered on both sides by dark pigment.

Paravertebral scales keeled. Most pronounced in males, on which keels form a distinct middorsal ridge; females only have 2–4 rows of keeled middorsal scales.

Ventral scales number 143 –165; 118–129 paired subcaudals; cloacal scute divided.

Top of head with nine enlarged, symmetrical plates.

Dorsal surfaces olive green, dull brown, to dark gray.

Only 12 scale rows at mid-body; scales very large.

Eyes very large; pupil round; iris pale gold, surrounded by a dark reticulum.

Head distinctly wider than neck.

Dention aglyphous; all maxillary teeth similar in size.

Venter, throat, and chin yellow; generally has a series of bold yellow spots on the lowest dorsal scale rows.

Similar species

- *Chironius exoletus* (p. 331) has a similar morphology but is green with a pale green venter.
- *Chironius grandisquamis* (p. 335) has a similar morphology but is jet-black above and white below; it never has a pale middorsal stripe.
- All other similarly patterned snakes have more than 12 scale rows covering the body.

Chironius grandisquamis

Least concern

Ebony Keelback (*Serpiente de Látigo Negra*)

A very large, shiny black snake with a long, whiplike tail and a pronounced middorsal keel, created by strongly keeled paravertebral scale rows. The body is compressed (almost triangular in large adults) in cross-section, and covered with only 10 rows of obliquely arranged large dorsal scales. Total length to 106.3 in (270 cm) in adult males; females smaller, to 78.7 in (200 cm).

Chironius grandisquamis ranges from northern Honduras to northwestern Ecuador. In Costa Rica, it occurs on both slopes. From near sea level to 5250 ft (1600 m).

Natural history

A relatively common species of lowland and premontane forests, most frequently seen in edge situations, especially on roadsides and along the banks of rivers and streams. Like the other Costa Rican species in the genus, *Chironius grandisquamis* is an active, fast-moving diurnal snake. It forages on the forest floor and in stream beds for amphibian prey. Large individuals are known to capture and eat large frogs such as the true frogs of the genus *Rana*, as well as the Central American bullfrog (*Leptodactylus savagei*). The skin toxins of the latter species apparently cause no harm to the snake. Besides frogs, *Chironius grandisquamis* feeds opportunistically on salamanders, lizards, birds, and rodents.

At night this snake sleeps coiled on vegetation, sometimes at considerable heights above the ground. When threatened, it takes off with lightning speed, but if cornered *Chironius grandisquamis* will display an impressive defensive behavior that includes hissing, flattening of the neck, gaping, and thrashing the tail back and forth. It will not hesitate to bite when pressed further.

This species is oviparous; and clutches of up to 15 eggs have been reported in April, May, and June.

Young *Chironius grandisquamis* displaying juvenile color pattern of tan and brown oblique crossbands on the body and tail. Its dorsal coloration will darken to jet-black over time, while the ventral surfaces stay white.

Description

The only Costa Rican snake with just 10 oblique rows of very large dorsal scales covering its body. Scales often look disheveled and wrinkled on parts of the body.

Most body scales shiny and smooth. Strongly keeled paravertebral scale rows form a distinct vertebral ridge in adult males; females have only weakly keeled paravertebral scale rows.

Ventral scales number 151–167; 129–155 paired subcaudals; cloacal scute divided.

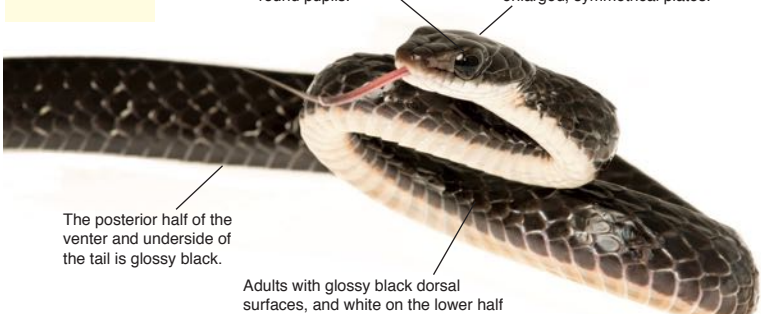
Body somewhat triangular in cross-section.

A very large snake with a long, whiplike tail and moderately large head.

Dentition aglyphous; all maxillary teeth similar in size.

Eyes large, with round pupils.

Top of head covered with nine enlarged, symmetrical plates.



The posterior half of the venter and underside of the tail is glossy black.

Adults with glossy black dorsal surfaces, and white on the lower half of the supralabial scales, chin, throat, and anterior part of the venter.

Similar species

- No other uniformly black snake in Costa Rica has only 10 dorsal scale rows.
- *Spilotes pullatus* (p. 394) has oblique pale yellow to cream streaks on the anterior part of the dorsum and sometimes on other parts of the body.
- *Clelia* species (pp. 420–423) have a cylindrical body without a vertebral ridge.

Dendrophidion apharocybe

Keeled Forest Racer (*Corredora Quillada*)

Least concern

A medium-sized, slender snake with large eyes. Has pale crossbands with dark borders on the neck and body that gradually change to a series of longitudinal stripes on the tail. Pale crossbands on the neck are always more than one scale in width, often two or three. Total length in both sexes to at least 40.9 in (104 cm).

Dendrophidion apharocybe ranges along the Atlantic slope from eastern Honduras to eastern Panama; in Costa Rica it marginally crosses the continental divide onto the Pacific slope in the Tilarán and Guanacaste mountain ranges; from near sea level to 4700 ft (1435 m).

Natural history

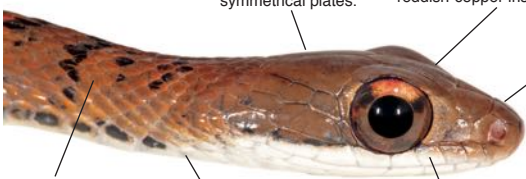
A series of recent studies on the genus *Dendrophidion* resulted in changes in the taxonomy of Costa Rican members, and resulted in the recognition of several new forms. The newly identified species *Dendrophidion apharocybe* represents the Atlantic slope populations of what was previously called *Dendrophidion vinitor* (*Dendrophidion vinitor* is now thought to be restricted to northern Central America). Populations found at middle elevations in the southern Talamanca Mountain Range that were once considered *Dendrophidion vinitor* are now considered a separate species, *Dendrophidion crybelum*.

These large-eyed, active snakes are commonly seen crawling on the forest floor, using their head to probe the leaf litter in search of food. Although mostly terrestrial, *Dendrophidion apharocybe* regularly climbs into low vegetation to bask, escape predators, and pursue prey. It feeds on frogs and small lizards, especially anoles, which are located using visual cues and caught with a quick dash. Members of the genus *Dendrophidion* generally sleep while coiled up in vegetatation, between 3–7 ft (1–2 m) above the ground, and are regularly found that way during night hikes.

Dendrophidion apharocybe inhabit the forest interior of undisturbed lowland and premontane wet forests. In areas where forest has been removed, individuals may persist in forest remnants, especially along vegetated stream corridors. They are most easily observed in edge situations such as on trails or at the edge of a clearing. When discovered, these snakes generally freeze and rely on their excellent camouflage. If approached closely, the snake will generally try to escape quickly. A pattern of bars and stripes effectively breaks up the outline of its body against the mosaic pattern of the forest floor. And, as the snake crawls, the motion of the alternating dark and light crossbands produces a stroboscopic effect that makes it difficult for predators to judge the direction in which the animal is headed. This effect is further enhanced under the prevailing low light conditions within the forest, or when only a segment of the snake's body is visible through an opening in the foliage. If caught, *Dendrophidion apharocybe* is capable of pseudoautotomy, and will attempt to escape from the grasp of a predator by breaking off a section of its tail, if restrained by it.

Dendrophidion apharocybe is oviparous; clutches of up to six eggs have been reported. Eggs have been found in April, and hatchlings were observed between March and July. It is thought that incubation takes approximately three months. Likely, the timing of hatching coincides with the availability of small prey, which tends to be most available in the wetter months of the year, when amphibians breed.

Description



Top of head with nine enlarged, symmetrical plates.

Eyes very large and striking, with a round pupil and reddish-copper iris.

Head somewhat wider than neck, with a moderately long, rounded snout.

Dentition aglyphous; all maxillary teeth similar in size.

Light crossbands on the neck are typically more than one scale row wide but become narrower on the posterior half of the body and tail.

Venter uniform white, cream, or pale yellow. Some individuals have a yellow chin and throat.

Light ventral color spills onto supralabial scales in area below eye.

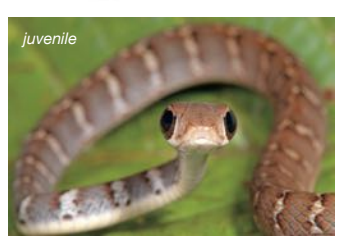
Dorsal coloration brown to gray, with a pattern of dark-bordered light gray to bluish-gray crossbands.

Sections of the dorsal color pattern may include a warm orange or brown wash, often on the head and neck area.

Dorsal scales prominently keeled; 17 scale rows at midbody.

Long-tailed and slender throughout, with a distinctly compressed body. Tail sometimes incomplete.

Crossbanded dorsal pattern gradually transforms into a series of longitudinal dark and light stripes on the tail.



Small juveniles appear to have particularly large eyes.

Ventral scales number 148–165; 111–128 paired subcaudals; cloacal scute not divided.

Similar species

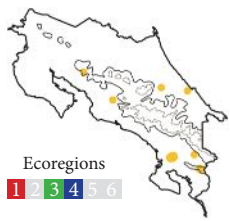
- *Dendrophidion crybelum* (p. 341) differs in details of hemipenis structure but it looks virtually identical. The two species are separated geographically.
- *Dendrophidion percarinatum* (p. 345) co-occurs locally and is most similar. It has a divided cloacal scute but can generally be recognized by the thinner light-colored bars (less than one scale wide, or absent) and more pronounced stripes on the posterior part of its body and tail.
- *Dendrophidion paucicarinatum* (p. 343) co-occurs at middle elevations; it has a more uniformly colored, mottled coloration without obvious bars and stripes; each ventral scale has a posterior black edge.
- In juvenile *Dendrophidion rufiterminorum* (p. 347), the light and dark bars are shaped like light-centered ocelli rather than counter-shaded bars.
- *Mastigodryas melanolomus* (p. 376) may have a dorsal checkerboard pattern as juveniles, but lack bars in their coloration as adults.

Dendrophidion clarkii

Green Forest Racer (*Corredora Verde*)

Data deficient

A medium-sized, slender racer with large eyes. Has a black collar on the back of the head and base of the neck (sometimes covers entire top of head). Top of head and anterior portion of body are green, gradually changing to brown—sometimes reddish-brown—on tail; may have a series of dark-bordered ocelli on the posterior half of the body and tail. Total length to 59.8 in (152 cm) in males, 61.0 in (155 cm) in females.



Dendrophidion clarkii occurs in isolated populations along both slopes of Costa Rica and Panama; also found on the Pacific slope of northern South America, down to western Ecuador. From near sea level to 5900 ft (1800 m).

Natural history

This predominantly South American species is rarely seen in Costa Rica, where there are a few isolated populations along the Pacific coast and two reliable sight records on the Atlantic coast. *Dendrophidion clarkii* is a recently established species that was previously included in *Dendrophidion nuchale*, together with another, related Costa Rican species, *Dendrophidion rufiterminorum*. Based on current observations, *Dendrophidion clarkii* is more likely to be found in the southern half of the country, whereas *Dendrophidion rufiterminorum*, which is a northern Central American species, occupies the northern half of the country.

Both species co-occur in the Guayacán de Siquírres area (Limón Province), as well as in the San Luis area (Puntarenas Province).

Dendrophidion clarkii is a day-active, agile racer found in forest interiors. It is terrestrial and hunts for prey in the leaf litter, although on occasion it climbs onto low vegetation. Presumably it sleeps coiled up in low bushes or small trees at night, as do other *Dendrophidion* species. Most individuals have been observed active by mid-morning

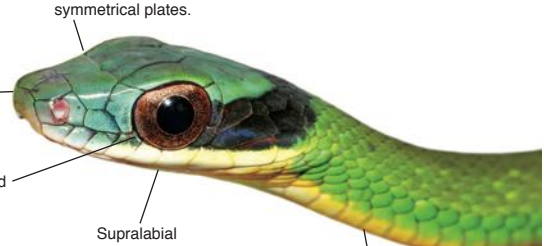
This species uses visual cues to find small leaf litter frogs, especially those in the genera *Craugastor*, *Diasporus*, and *Pristimantis*. Small lizards are possibly included in its diet.

A small number of individual *Dendrophidion clarkii* have been found with an incomplete tail; these snakes are capable of breaking off part of the tail when it is restrained by predators.

This species is oviparous; clutch sizes of up to seven eggs have been documented.

Description

Dentition aglyphous; all maxillary teeth similar in size.



Ventral scales number 160–175; 140–160 paired subcaudals; cloacal scute usually divided.

Similar species

- *Dendrophidion rufiterminorum* (p. 347) has a reddish-brown head without a black collar in the neck region.
- Other *Dendrophidion* species do not have a green body.
- *Drymobius melanotropis* (p. 353) and *Leptophis* species (pp. 363–373) have a similar body shape and green coloration, but all lack a black nuchal collar.

Dendrophidion crybelum

Least concern

Talamanca Forest Racer (*Corredora Quillada Pacífica*)

A medium-sized, slender racer with large eyes. Pale crossbands with dark borders on the neck and body gradually change to a series of longitudinal stripes on the tail. Pale crossbands are more than one scale wide on the neck. Total length to 38.6 in (98 cm) in males, 35.0 in (89 cm) in females.

Dendrophidion crybelum has a very small distribution range in extreme southwestern Costa Rica, in the Talamanca Mountain Range near the border with Panama; from 3610–4365 ft (1100–1330 m). Although not yet confirmed, it likely occurs in adjacent western Panama.

Natural history

This recently recognized species was previously included in *Dendrophidion vinitor*, which is now considered to be restricted to northern Central America (populations of *Dendrophidion vinitor* found on the Atlantic slope of Costa Rica are currently placed in *Dendrophidion apharocybe*). *Dendrophidion crybelum*, as currenty understood, is very closely related to *Dendrophidion apharocybe*, but differs from the latter mostly in details of its hemipenis structure.

Dendrophidion crybelum is known from only a few individuals and a small geographic area. It was originally described from the area that is now Wilson Botanical Gardens and Las Cruces Biological Station, near San Vito, but it is also known from a few other forested sites in the region such as Las Tablas and Las Alturas de Coton, both on the edge of La Amistad International Park, in the border region with Panama.

Like other *Dendrophidion* species, this is an active, daytime hunter of leaf litter frogs and small lizards. At night, these snakes coil up in low vegetation and sleep, usually 3–7 ft (1–2 m) above the ground. At times, they may climb into low vegetation during the day, in pursuit of prey or to escape predators. These are agile, fast-moving snakes that initially freeze in place and rely on their crypsis to escape detection, but escape at great speed when approached. All *Dendrophidion* species appear capable of pseudoautotomy and can purposely break off sections of their tail if a predator grabs it, thus allowing them to escape. A small number of individuals of these species have incomplete tails for this reason.

Although considerable areas of undisturbed forest still exist in the area, especially within the La Amistad protected area, much of the known distribution range of *Dendrophidion crybelum* has been affected by deforestation. Although it is capable of adapting to some habitat change, it is not clear how the broadscale habitat conversion in the region has affected this species. In addition, *Dendrophidion crybelum* inhabits an area with documented dramatic declines in local amphibian populations as a result of a deadly chytrid fungus. It is unclear how the loss of important prey has impacted this species, but *Dendrophidion crybelum* has not been formally reported in several years. A relatively recent herpetological study in the Las Cruces area revealed a few individuals of *Dendrophidion percarinatum*, but the other locally known species of *Dendrophidion* (*clarkii*, *crybelum*, and *paucicarinatum*) were not found, and additional surveys are warranted to assess the population status of these snake species.

Dendrophidion crybelum is oviparous, but little is known about its reproductive biology. Data from preserved museum specimens indicates that clutches of at least four eggs are to be expected, and that eggs may be laid during the rainy season (May through November), which would coincide with a period of increased amphibian reproduction.

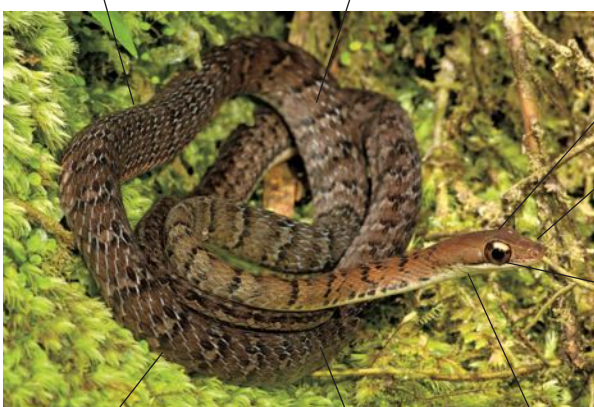
Description

Moderately slender, with a slightly compressed body and a long tail, which is incomplete in some individuals.

Pale crossbands at least one scale wide (especially on neck); they tend to transform into a linear series of dark-bordered ocelli on the posterior section of the body and tail.

17 rows of keeled scales at midbody.

Dentition aglyphous; all maxillary teeth similar in size.



Top of head with nine enlarged, symmetrical plates.

Head moderately large and somewhat wider than neck; snout fairly angular.

Eyes very large and prominent, with round pupil and reddish-brown irises.

Ventral surfaces uniform white, pale gray, cream, or pale yellow.

Dorsal coloration yellowish-brown to deep chocolate-brown, with a series of prominent, pale crossbands that have dark borders. Crossbands suffused with orange on the neck and posterior part of the body; cream or grayish elsewhere.

Color of supralabial scales matches chin color, invariably much lighter than dorsal color and usually separated by an irregular dark stripe along the upper sutures of the supralabial scales.

Ventral scales number 150–162; 112–119 paired subcaudals; cloacal scute divided.

Similar species

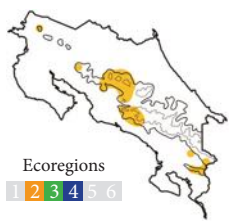
- *Dendrophidion apharocybe* (p. 337) differs in details of hemipenis structure. It looks virtually identical but is geographically separated.
- *Dendrophidion percarinatum* (p. 345) co-occurs locally and is most similar. It has a divided cloacal scute but can generally be recognized by the thinner light-colored bars (absent, or less than one scale wide) and more pronounced stripes on the posterior part of its body and tail.
- *Dendrophidion paucicarinatum* co-occurs at higher elevations; it is more uniformly colored, mottled, and lacks obvious bars and stripes; each ventral scale has a posterior black edge.
- *Dendrophidion clarkii* (p. 339) has a black band in the nape and extensive green coloration.

Dendrophidion paucicarinatum

Least concern

White-lipped Forest Racer (*Corredora de Labios Blancos*)

A medium-sized, slender racer with strikingly large eyes. Fairly nondescript; dorsum uniform dull green, olive, or dark brown; venter is cream or yellow. Large adults may have light-centered dorsal scales; juveniles sometimes faintly crossbanded. Each ventral scale typically edged with black pigment along its posterior margin. Total length to 48.4 in (123 cm) in males, 60.2 in (153 cm) in females.



Dendrophidion paucicarinatum occurs at middle elevations in the Guanacaste, Tilarán, Central, and Talamanca mountain ranges of Costa Rica and in adjacent western Panama; from 2330–7740 ft (710–2360 m).

Natural history

A fast-moving diurnal species of upland rainforest and cloud forest habitats. *Dendrophidion paucicarinatum* is largely terrestrial but occurs in areas of dense undergrowth and will occasionally scale low vegetation or rocky outcroppings. This large-eyed, visual hunter preys on leaf litter frogs. It used to be regularly seen in some areas such as Monteverde, but apparently was never common in other montane regions. However, since the decline in amphibian species started to impact Costa Rica in the late 1980s and early 1990s, records of *Dendrophidion paucicarinatum* have decreased significantly, and it is no longer a common species anywhere in its range. In recent years, some areas have shown signs of modest recovery in their local amphibian populations and it will be interesting to see whether frog-eating snake species will start to increase in numbers as a consequence.

Like other *Dendrophidion* species, this species can break off sections of its tail when it is restrained by a predator. A small percentage of individuals have an incomplete tail, a sign that this antipredator strategy can be effective. Unlike lizard tails, snake tails do not regrow.

Dendrophidion paucicarinatum is oviparous; clutch sizes of up to 12 eggs have been reported. Reproductive activity and females with eggs have been observed during the rainy season (April through November); hatching of young likely coincides with periods of increased prey availability.

Description

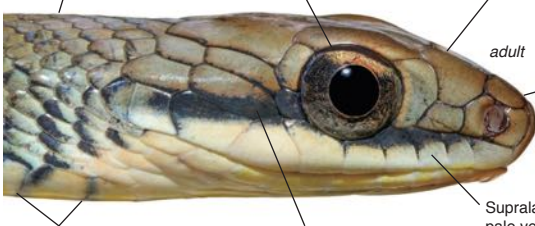
Young individuals may have a faint pattern of poorly defined, alternating dark and light crossbands.

Ventral scales number 179–195; 119–139 paired subcaudals; cloacal scute usually divided.

Body slender, slightly compressed; tail long.

juvenile

Ventral coloration paler than dorsum: white, cream, or pale yellow. Most vivid in juveniles, which tend to have a pale yellow chin and neck, gradually changing to pale green on the venter and lowest dorsal scale rows, and to cream below the posterior half of the body and the tail.



Dorsum relatively uniform brown, grayish-green, olive, or gray; larger individuals often have pale-centered scales that create a mottled appearance.

Dentition aglyphous; all maxillary teeth similar in size.

Similar species

- Other *Dendrophidion* species lack dark-edged ventral scales and their ventral surfaces are uniformly light-colored; many have a dorsal pattern consisting of bars and longitudinal stripes.
- *Drymobius margaritiferus* (p. 351) has more pronounced light-centered scales and has a diagnostic Y-shaped light mark on its head.
- *Drymobius melanotropis* (p. 353) is generally bright leaf green, with a yellow throat.
- *Phrynonax poecilonotus* (p. 384) has more dorsal scale rows (19–25), and these are arranged in oblique rows.

Dendrophidion percarinatum

Least concern

Barred Forest Racer (*Corredora de Barras*)

A medium-sized, slender racer with large eyes. Has a faint pattern of pale crossbands with dark borders on the neck and body that gradually changes to a series of longitudinal stripes on the tail. Pale crossbands are thin, less than one scale wide, and may not be visible from a distance. Total length to 46.1 in (117 cm) in both sexes.

Dendrophidion percarinatum ranges from northeastern Honduras to northwestern Ecuador. In the northern part of its range, it is found on the Atlantic slope only, but from northwestern Costa Rica southward it occurs along both slopes; from near sea level to 3935 ft (1200 m).

Natural history

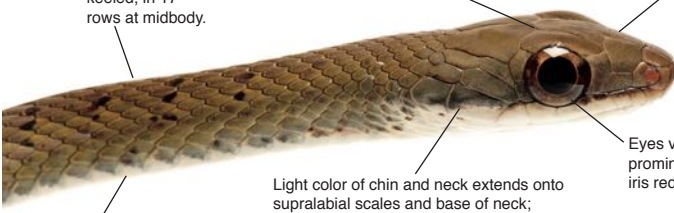
Dendrophidion percarinatum is a common species of intact forests. It is active during the day; mainly terrestrial, at night it climbs onto low vegetation and sleeps, coiled up, on branches 5–7 ft (1.5–2 m) above the forest floor. Individuals are usually spotted along trailsides or other habitat edges, or along the perimeter of clearings. *Dendrophidion percarinatum* seems somewhat tolerant of habitat alteration, as long as sufficient forest cover is available. Often, these snakes occupy the wetter microhabitats within a forested area, along stream corridors or near wetlands.

Dendrophidion percarinatum feeds on frogs. Primarily a lowland species, it does not appear to be affected by the catastrophic decline in amphibian populations to the same extent as are middle elevation frog-eating snakes such as *Dendrophidion paucicarinatum*. It searches for its amphibian prey in the leaf litter on the forest floor. The large eyes of these agile, fast-moving snakes indicate that they are primarily visual hunters, and individuals tend to probe nooks and crannies with their head in search of prey. When spotted, they sometimes freeze in place and rely on their cryptic coloration to escape detection; if approached, they will rapidly escape into a nearby dense tangle of vegetation. If grabbed by the tail, this snake will twist and turn its body, causing part of the tail to detach. Sacrificing a section of its long tail to a predator seems to be an effective survival strategy, as is evident from the significant number of individual *Dendrophidion percarinatum* that are missing part of the tail.

Dendrophidion percarinatum is oviparous, but details of its reproductive biology are not known. It likely produces clutches of at least five or six eggs that hatch during the rainy season to ensure that adequate small amphibian prey is available for the young.

Leaf litter frogs such as *Craugastor fitzingeri* are an important prey item for *Dendrophidion percarinatum*. The snake usually swallows them alive.

Description



Top of head with nine enlarged, symmetrical plates.

Head slightly wider than neck, with a moderately long, rounded snout.

Dorsal scales keeled, in 17 rows at midbody.

Eyes very large and prominent; pupil round, iris reddish copper.

Light color of chin and neck extends onto supralabial scales and base of neck; generally separated from dorsal color by a faint dark stripe along the upper suture of the supralabial scales.

Venter uniform white, cream, or yellow.

Dorsum grayish-brown to a warm, yellowish-brown.

Crossbanded dorsal pattern gradually transforms into a series of poorly defined dark and light longitudinal stripes on the posterior half of the body and the tail.

Slender, with a distinctly compressed body; tail long (sometimes incomplete).

Ventral scales number 179–195; 119–139 paired subcaudals; cloacal scute usually divided.

Dentition aglyphous; all maxillary teeth similar in size.

Pale crossbands with dark borders mark both sides of the body, but are most prominent on the neck. Crossbands thin, less than one scale wide. They are often so faintly indicated that the dorsal coloration appears nearly uniform.

Similar species

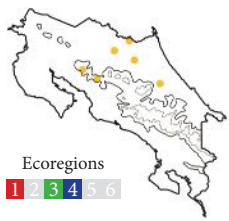
- Most similar to *Dendrophidion apharocybe* (p. 337) and *Dendrophidion crybelum* (p. 341), which are generally more boldly patterned on the anterior portion of the body; bars are typically two or three scale rows wide (one scale row wide or less in *Dendrophidion percarinatum*). These two species each have an undivided cloacal scute (divided on *Dendrophidion percarinatum*).
- Other *Dendrophidion* species have a different color pattern.
- Adult *Mastigodryas melanolomus* (p. 376) lack vertical bars and tend to have a salmon-colored venter (cream on Pacific slope).

Dendrophidion rufiterminorum

Vulnerable

Red-headed Forest Racer (*Corredora Cabezaroja*)

A medium-sized, slender racer with large eyes. The combination of a reddish-brown head and tail and a greenish, brown, or slate-gray body is diagnostic. Total length to 56.3 in (143 cm) in males, 61.4 in (156 cm) in females.



Dendrophidion rufiterminorum occurs in two disjunct distribution ranges. Individuals are known from the Atlantic slope of Belize, Guatemala, and northern Honduras, while a southern cluster occurs on both slopes of northern Costa Rica, as well as in adjacent Nicaragua. From near sea level to at least 3280 ft (1000 m).

Natural history

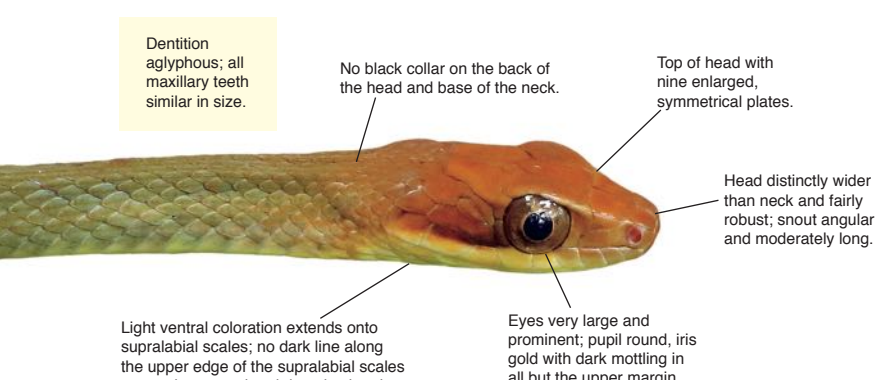
Dendrophidion rufiterminorum is a recently established species that was previously included in *Dendrophidion nuchale*, together with the related Costa Rican species *Dendrophidion clarkii*. *Dendrophidion rufiterminorum* is primarily found in northern Central America but does range into northern Costa Rica, where it is known from only a handful of locations.

For the most part, it is geographically isolated from the more southern *Dendrophidion clarkii*, but both species co-occur in at least two locations: in the Guayacán de Siquírres area (Limón Province) and the San Luis area (Puntarenas Province).

This beautiful, active snake is terrestrial. It inhabits the leaf litter layer of intact forest habitats. On occasion it will climb into low bushes to pursue prey, and at night it presumably sleeps coiled onto branches several feet above the forest floor. Like other *Dendrophidion* species, it feeds on leaf litter frogs and possibly small lizards such as anoles, which are tracked down using visual cues.

This is an oviparous species with clutches of up to six eggs reported.

Description



17 rows of keeled scales at midbody.

Body slender and noticeably compressed; tail long and sometimes incomplete.

Adults with a reddish-brown head. Anterior part of body greenish-brown, olive-brown, or grayish-green, gradually darkening to very dark brown or black, and changing to reddish brown on the tail again.

Ventral scales number 161–174; 136–152 paired subcaudals; cloacal scute nearly always undivided.

Juvenile coloration similar, but reddish-brown head cap and tail are pale brown rather than reddish-brown, and dorsal coloration is olive-green to dark grayish-green.

A series of poorly defined dark crossbands or dark-bordered ocelli are present on each side of the body, but most prominent on the posterior portion of the body and tail. Patterning most obvious in juveniles; markings disappear as adult coloration develops.

Ventral coloration white below chin and neck; gradually changes to pinkish-red below posterior portion of body and tail.

Similar species

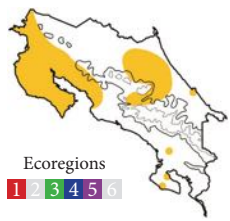
- *Dendrophidion clarkii* (p. 339) is leaf-green with a pronounced black nuchal collar.
- Other *Dendrophidion* species lack a reddish-brown head and tail.
- *Urotheca fulviceps* (p. 533) has a reddish-brown head but lacks a red tail; it has smooth dorsal scales.

Drymarchon melanurus

Black-tailed Cribo (*Sabanera Real*)

Least concern

A very large snake. Pale brown coloration gradually darkens towards the tip of the tail. Has a diagnostic pattern of black lines: there is a diagonal one on each side of the neck; smaller lines mark the sutures of the lip shields below and behind each eye. Total length to 118 in (300 cm), but most individuals are significantly shorter.



Drymarchon melanurus ranges from southern Texas (US) and northern Mexico southward along both slopes into central Panama; it also occurs locally in northern South America (Ecuador, Colombia, and Venezuela). From near sea level to 6235 ft (1900 m).

Natural history

This fast-moving, robust snake is among the largest snakes in Costa Rica, and full-grown adults are an impressive sight. *Drymarchon melanurus* is a day-active, terrestrial species that inhabits a wide variety of habitats throughout its extensive range. In Costa Rica, it is most commonly found in the drier regions of the Pacific northwest, but isolated and infrequent observations exist from other parts of the country, including the much wetter Atlantic lowlands. In dry habitats, *Drymarchon melanurus* is often seen near watercourses. It hunts for prey in marshy areas, along stream courses, and in (drying) riverbeds. This powerful constrictor is a true omnivore, and prey items include fish and frogs, reptiles (lizards, snakes, and turtles have been documented as prey items), mammals, and birds and their eggs. Bird eggs seem to be a favored menu item, and large individuals have reportedly been observed to eat eggs out from underneath brooding chickens, without attempting to eat the birds.

Notably, *Drymarchon melanurus* is known to eat members of its own species, but it also consumes venomous snakes such as the Middle American rattlesnake (*Crotalus simus*). A well-documented Guatemalan individual, which measured 116 in (295 cm) in total length, was found to contain a 66-in (168-cm) *Boa imperator* and a 37.5-in (95-cm) jumping pitviper (*Atropoides nummifer*) in its stomach!

When discovered, *Drymarchon melanurus* will rapidly flee, but if no escape route is available, it presents an impressive defensive display in which it raises its head off the ground, inflates and spreads its neck region, and rattles its tail tip against the substrate in a rattlesnake-like fashion. When pressed further, it may strike and bite. Although it is not venomous, these are strong snakes and a large individual can deliver a painful bite.

Drymarchon melanurus is oviparous; it lays small clutches, generally of 4–25 eggs that are large and produce relatively large hatchlings. Incubation takes more than three months. Females of this species are known to retain sperm and produce fertilized eggs up to four years after mating. Males carry out ritualized combat dances as part of courtship and to establish mating privileges during periods of reproductive activity.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 188–215; 56–88 paired subcaudals; cloacal scute undivided.

Similar species

- *Masticophis mentovarius* (p. 374) is similar in shape, size, and coloration, but lacks the black diagonal stripes on the head and neck.
- Juvenile *Mastigodryas melanolomus* (p. 376) have dark supralabial markings but have a checkerboard dorsal pattern; adults have a salmon-orange to red venter (cream on Pacific slope).
- *Phrynonax poecilonotus* (p. 384) is variable in coloration but never has black diagonal stripes on the head and neck.

Drymobius margaritiferus

Speckled Racer (*Ranera Común*)

Least concern

An active, terrestrial snake. This is the only snake in Costa Rica that has dorsal scales with pale centers; the dark green to black dorsal scales each have an orange or yellow center; the top of the head is greenish-brown to black with a yellowish, Y-shaped marking. Total length to 53.1 in (135 cm).

Drymobius margaritiferus has an extensive distribution, from the southern US throughout Central America to Colombia, along both slopes; from near sea level to 4920 ft (1500 m).

Natural history

This beautiful, active snake is commonly found in a variety of habitats, ranging from humid tropical rainforests and arid scrub savannas in the lowlands, to high elevation cloud forests. It also occurs near human settlements, particularly around man-made ponds, cattle watering holes, washing troughs, and irrigation systems that create wet microhabitats and attract amphibians.

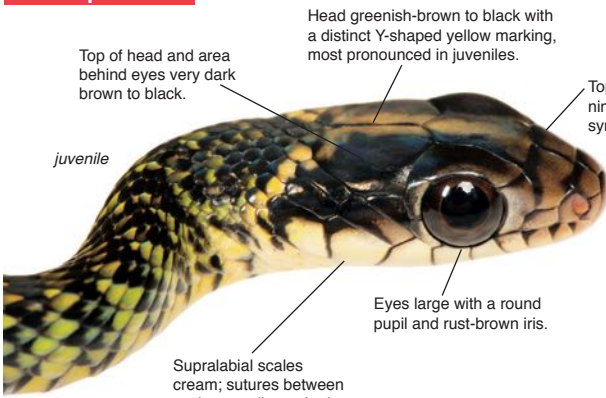
Its preferred prey is diurnal frog species that inhabit the vegetation bordering wetlands (mostly members of the families Ranidae and Leptodactylidae, true frogs and foam-nest frogs, respectively); *Drymobius margaritiferus* can be seen rapidly chasing these frogs during the day. These snakes have also been observed capturing sleeping nocturnal frogs, often tree frogs (family Hylidae), which they sometimes find during their daytime forays. *Drymobius* species have prominently large eyes and mostly hunt using visual cues. When no frogs are available, they may switch food preferences, and fish, lizards, snakes, small mammals, and (for juvenile snakes) even insects have been reported as prey.

All species of *Drymobius* have enlarged teeth in the back of the mouth; bites may cause excessive bleeding and sometimes a tingly sensation, suggesting that anticoagulants and possibly a mild neurotoxin are introduced during a bite.

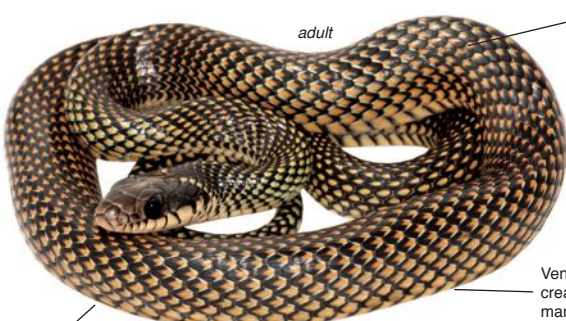
Drymobius margaritiferus is oviparous; Costa Rican individuals have been reported to lay clutches of up to eight eggs between February and August. After an incubation period of slightly over two months, the juveniles emerge at the onset of the rainy season, roughly from April through November, when the abundance of their amphibian prey is highest. Gatherings of multiple individuals (one report mentions up to 25 snakes) have been observed. These gatherings may be a courtship ritual or a mating frenzy; similar gatherings are known from some temperate snake species but have rarely been described for tropical snakes.

Like other species in its genus, *Drymobius margaritiferus* can break off sections of its tail to escape predation. When handled, these snakes often roll along their body axis, trying to wriggle free; if the tail is restrained, the physical torque on the vertebrae will cause a section of the tail to break along a vertebral fracture plain. The lost section of tail does not regenerate. Interestingly, *Drymobius margaritiferus* has also been reported to play dead to avoid predation, turning itself on its back and drooping its mouth open.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.



Ventral scales number 137–150; 100–121 paired subcaudals; cloacal scute divided.

Similar species

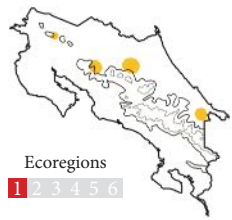
- This is the only snake in Costa Rica whose dorsal scales all have a pale center.

Drymobius melanotropis

Green Racer (*Ranera Verde*)

Least concern

A diurnal, terrestrial snake. Dorsum is leaf-green, snout rust-brown to orange; ventral surfaces, throat, and chin are lemon-yellow. Dorsal scales in 17 rows; several middorsal scale rows bear pronounced, sometimes black, keels. Total length to 51.9 in (132 cm).



Drymobius melanotropis is known from isolated populations in the foothills of the Atlantic slope, from eastern Honduras to southeastern Costa Rica; from 1300–3935 ft (400–1200 m).

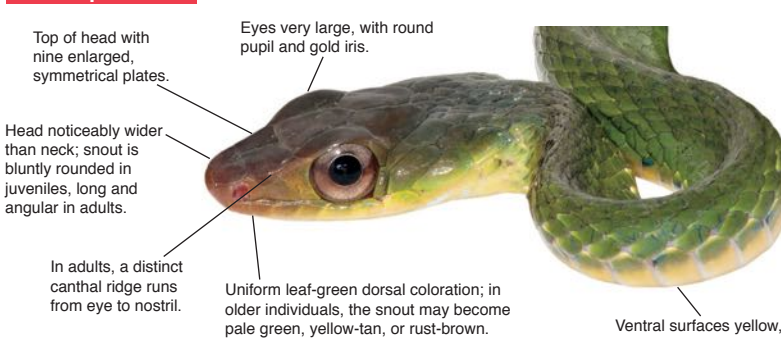
Natural history

A very fast, diurnal snake that is similar in behavior and biology to *Drymobius margaritiferus*, but far less common and less widely distributed. While *Drymobius margaritiferus* is mostly found in relatively open habitats, *Drymobius melanotropis* is restricted to the interiors of undisturbed, wet rainforest habitats and is therefore rarely seen. It feeds primarily on frogs; during the day, it actively seeks out frog prey on the forest floor. Judging from this snake's habitat, it likely hunts litter frogs of the family Craugastoridae, but certainly will also capture other types of frogs opportunistically. Limited observations of *Drymobius melanotropis* populations suggest that their numbers greatly decreased in the early 1990s, after Costa Rica's amphibian populations declined dramatically (especially at middle elevations) in response to the arrival of a deadly chytrid fungus, but since then their numbers have recovered somewhat.

Drymobius melanotropis is oviparous. No records exist of its clutch size or the timing of its oviposition, but hatchlings are found from March through September, suggesting that reproduction is synchronized with the onset of the rainy season, when frog reproduction peaks and small prey is abundant for the young snakes.

Drymobius melanotropis can break off sections of its tail if restrained by a predator. This anti-predator technique, called pseudoautotomy, serves to distract potential predators; the severed tail tip continues to wriggle for several minutes, distracting the predator as the snake escapes.

Description



Description

The 3 vertebral scale rows typically have black keels; all other scale rows have green keels.

adult

A moderately slender snake with a slightly compressed body and a long tail (which breaks off readily and is therefore sometimes incomplete).

17 rows of keeled scales at midbody.

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

juvenile

Skin between scales marked with a pattern of alternating black and white zebra stripes, sometimes visible as indistinct transverse dark markings on the green dorsum (more noticeable in juveniles than in adults).

Ventral scales number 149–164; 90–104 paired subcaudals; cloacal scute divided.

Rarely, adults can be a uniform rust-brown.

Similar species

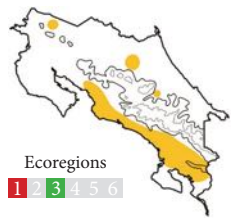
- *Chironius exoletus* (p. 331) has a distinct middorsal ridge, a compressed or triangular body, and only 12 dorsal scale rows.
- *Leptophis* species, especially *Leptophis depressirostris* (p. 365), can be similar in appearance but generally have a black eye stripe.
- *Oxybelis fulgidus* (p. 382) and *Oxybelis brevirostris* (p. 380) have an exceedingly slender body and a long, pointed snout.
- *Dendrophidion clarkii* (p. 339) and *Dendrophidion rufiterminorum* (p. 347) have a reddish-brown tail.

Drymobius rhombifer

Blotched Racer (*Ranera Manchada*)

Least concern

A slender, terrestrial snake with large eyes and round pupils; dorsal coloration brown, with a middorsal series of diamond-shaped blotches that have dark borders and pale centers. Top of the head is uniformly brown; pale color on chin and throat extends onto lower sides of head. Total length to 47.2 in (120 cm).



Drymobius rhombifer occurs in lowlands and foothills of Costa Rica, Panama, Colombia, Ecuador, Peru, and northern Venezuela. It also occurs in extreme southern Nicaragua. From near sea level to 3935 ft (1200 m).

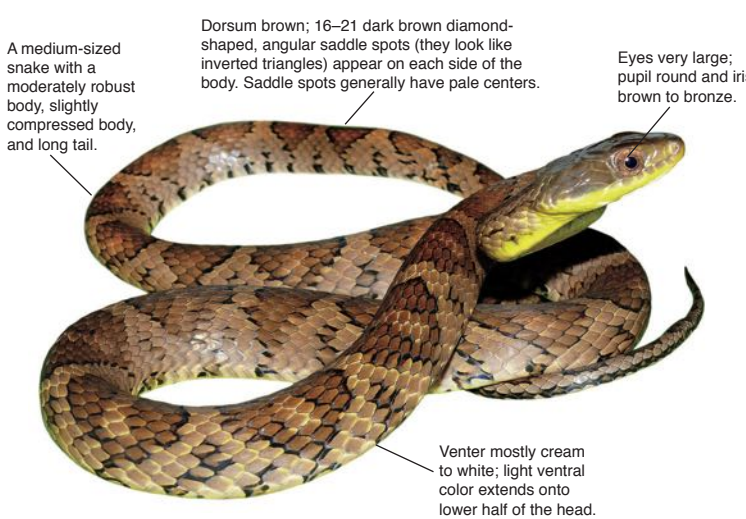
Natural history

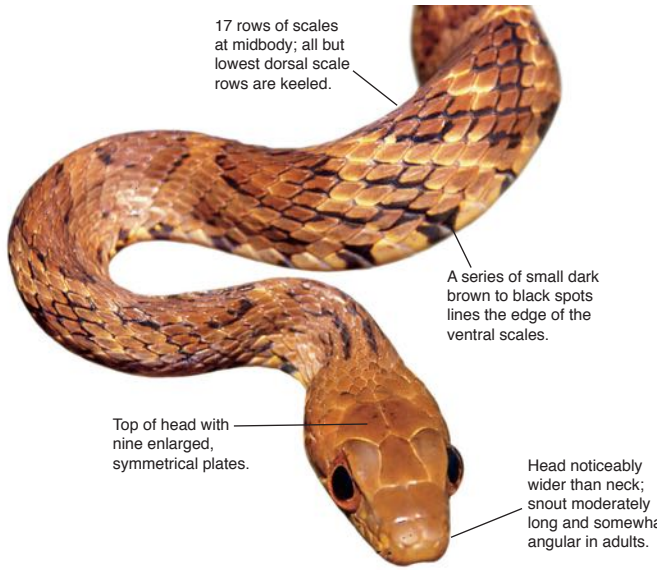
Drymobius rhombifer is rare in Costa Rica, and its habits are largely unknown. Presumably its biology is similar to that of the other two *Drymobius* species found in country, as well as the closely related snakes of the genus *Dendrophidion*. *Drymobius rhombifer* is likely a diurnal, active hunter of frogs and toads, and perhaps occassionally also takes reptiles. Limited observations show that this is a terrestrial species, but it may climb into low vegetation.

Drymobius rhombifer is oviparous, but details of its reproductive behavior in Costa Rica are unknown. An observation of a pair of these snakes in Rara Avis Rainforest Reserve, Costa Rica, suggests that courtship takes place in July.

Likely, oviposition and incubation are synchronized with the onset of the rainy season to ensure that hatchling snakes have acess to large numbers of froglets.

Description





Ventral scales number 145–163; 84–108 paired subcaudals; cloacal scute divided.

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Similar species

- *Xenodon rabdocephalus* (p. 540) has smooth dorsal scales that are arranged in oblique, sinuous rows.
- *Stenorrhina degenhardtii* (p. 396) has a short, rounded snout, more robust body, and strikingly short tail.
- Juvenile *Senticolis triaspis* (p. 392) have a similar dorsal pattern but note distinctively elongated snout and a much higher dorsal scale count (27–39 scale rows).
- *Leptodeira* species (pp. 470–477) have vertically elliptical pupils.
- *Bothrops asper* (p. 587) has loreal pits and lacks symmetrical plates on top of the head

Lampropeltis abnorma

Data deficient

Tropical Tricolored Milksnake (*Serpiente de Leche de Tres Colores*)

Medium-sized to very large, with a cylindrical body and a relatively small, narrow head. Red, white, and black rings completely encircle the body. Each of the 19–31 red rings is bordered on both sides by a black ring. Head is black, typically with a narrow, V-shaped, white band across the snout. Total length to 72.4 in (184 cm) in Costa Rican populations.

Lampropeltis abnorma ranges along the Atlantic slope from Veracruz and Guerrero, Mexico, to southern Nicaragua; on the Pacific slope, it occurs in northwestern Costa Rica, including the Tilarán Mountain Range. From near sea level to 5250 ft (1600 m).

Natural history

Until 2014, this species was considered part of the extremely wide-ranging and variable species *Lampropeltis triangulum*. It was long understood that the notion of a single species ranging from southern Canada southward, through much of the United States and Central America, and into South America, was not likely accurate. As a result, *Lampropeltis triangulum* was tentatively divided into a number of subspecies, mostly based on color and pattern characteristics. But a recent study of molecular and morphological data led to several subspecies being combined and elevated to full species status. *Lampropeltis abnorma* contains the previously recognized subspecies *Lampropeltis triangulum blanchardi*, *L. t. hondurensis*, *L. t. oligozona*, and *L. t. stuarti*.

Lampropeltis abnorma is terrestrial and generally crepuscular or nocturnal, although it tends to be more active during the day in densely forested, and thus shaded, areas. This species occurs in low densities and is quite secretive; it is therefore not often observed.

Lampropeltis abnorma can reach an impressive size, but even small individuals are powerful constrictors. These snakes feed on a variety of prey, mostly small mammals, but also birds, reptiles, and their eggs.

This species does not display an ontogenetic change in its color pattern, and juveniles as well as large adults retain a bold pattern of red, black, and white or cream rings that completely encircle the body. Its color pattern is like that of several coralsnakes and their mimics. However, in venomous coralsnakes (genus *Micrurus*) each red ring is bordered on both sides by a white or yellow ring, whereas in *Lampropeltis abnorma* each red ring is bordered on both sides by black rings; this species is completely harmless.

Lampropeltis abnorma is oviparous and produces clutches of up to 16 eggs. In areas with a pronounced dry season, it is likely that reproduction does not continue year-round and that oviposition is somehow correlated with seasonality.

Description

Top of head with nine enlarged, symmetrical plates.

Red and light-colored scales usually have black tips.

Head black, typically with a V-shaped light band across the snout and a narrow light-colored band crossing the back of the head.

Eyes of moderate size, with round pupils; iris dark brown to nearly black.

Ventral scales number 219–242; 49–59 paired subcaudals; cloacal scute undivided.

Encircling the body are 19–31 broad red rings, bordered on both sides by a narrow black ring; each black-red-black ring combo is separated from the next by a narrow white or cream ring.

All colored rings completely encircle the body.

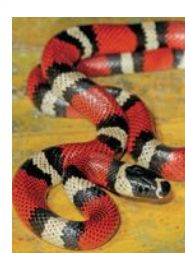
17–23 (usually 21 or 23) rows of smooth scales at midbody.

Body cylindrical and robust, with a short tail.

Tail tricolored.

Head only slightly wider than neck, with a rounded snout.

First black ring on the body is very narrow (1 or 2 scales wide).



Dentition aglyphous; all maxillary teeth similar in size.

Lampropeltis abnorma generally retains its bright, coralsnake-like color pattern throughout its life, while individual *Lampropeltis micropholis* tend to darken with age. Note that the order of the color bands in *Lampropeltis* differs from that in venomous coralsnakes (genus *Micrurus*).

Similar species

- *Lampropeltis micropholis* has fewer red rings and a broad, straight-edged light band across the snout; large individuals gradually darken and may become completely black.
- *Erythrolamprus bizona* (p. 442) has a double nuchal black band and only 15 scale rows at midbody.
- *Erythrolamprus mimus* (p. 446) has 15 scale rows at midbody, and each black ring is partly divided by a white band.
- In true coralsnakes (genus *Micrurus*), and some mimics, each red ring is bordered by white or yellow, not by black.

Lampropeltis micropholis

Data deficient

Tropical Black Milksnake (*Serpiente de Leche Negra*)

A medium-sized to very large snake with a cylindrical body and a relatively small, narrow head; dorsal scales appear in 17–23 rows. Color pattern consists of a series of red, white, and black rings that completely encircle the body. Each of the 10–18 red rings is bordered on both sides by a black ring. Light band across snout is broad and straight, not V-shaped, and snout is marked with light spots. Individuals darken with age and may be almost uniform black. Total length to 78.3 in (199 cm).

Lampropeltis micropholis ranges from northeastern Costa Rica southward throughout Panama and into northern South America (western Ecuador, northern Colombia, and possibly northern Venezuela); from near sea level to at least 8200 ft (2500 m).

Natural history

A 2014 study of the various subspecies that had been recognized within the extremely variable species *Lampropeltis triangulum* challenged the notion that a single species of milksnake occurs from southern Canada to northern South America. This study also suggested that variation in color pattern alone is not a solid basis for defining species. *Lampropeltis micropholis*, as currently defined, represents a mostly South American lineage that includes the formerly designated subspecies *Lampropeltis triangulum andesiana*, *L. t. gaigea*, and *L. t. micropholis*.

Lampropeltis micropholis is uncommonly seen in Costa Rica; it appears to be more common at higher elevations than at lower elevations. This terrestrial, diurnal snake actively hunts for small mammals and other prey such as reptiles, birds, and their eggs. These are muscular snakes that constrict their prey; their dentition is aglyphous and, although they can deliver a potentially painful bite, they are perfectly harmless to humans.

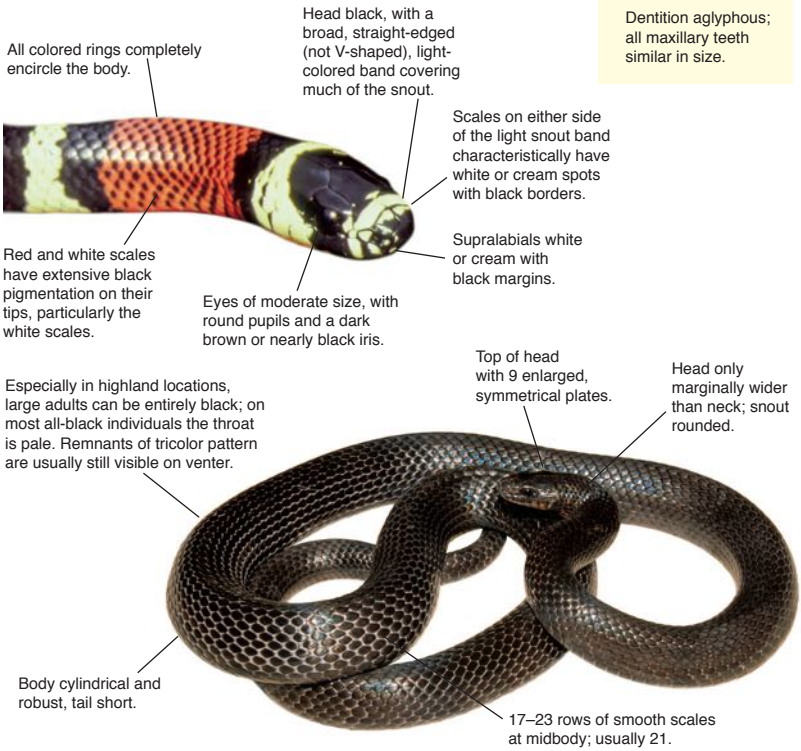
This is an oviparous species capable of producing clutches of up to 16 eggs. Not much is known about its natural history and there is little information available on its reproductive cycles.

Neonate and juvenile *Lampropeltis micropholis* have a bold color pattern of red, white, and black rings on their body and tail. As they grow, their color pattern changes ontogenetically, with black pigment encroaching on the white scales, while the black tips of the red scales gradually expand in size. Once individuals reach a total length of about 43 in (110 cm), they may look mainly black, with all colored rings obscured by dark pigment. Larger individuals are often solid black throughout, usually with a pale patch on the throat remaining.

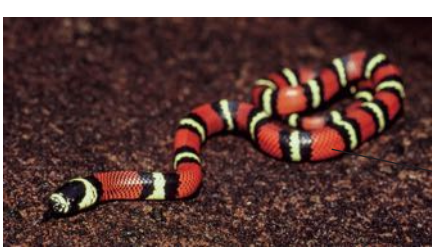
The juvenile color pattern of this species is like that of several coralsnakes and their mimics. However, in venomous coralsnakes (genus *Micrurus*) each red ring is bordered on both sides by a white or yellow ring, whereas in *Lampropeltis micropholis* each red ring is bordered on both sides by black rings. If potential coralsnake mimics such as *Lampropeltis micropholis* gain protection from resembling a venomous species, then it is unclear how selective pressure drives the ontogentic color change seen in this species. More research is needed to investigate these potential model-mimic systems.

Lampropeltis micropholis eating prey.

Description



Dentition aglyphous; all maxillary teeth similar in size.



10–18 broad, red rings are bordered on both sides by a narrow black ring. Each black-red-black ring combo is separated from the next by a narrow, light-colored (white or cream) ring. Tail tricolored.

Ventral scales number 209–236; 39–63 paired subcaudals; cloacal scute undivided.

Similar species

- *Lampropeltis abnorma* (p. 357) has more red rings and a V-shaped light band across the snout.
- *Erythrolamprus bizona* (p. 442) has a double nuchal black band and only 15 scale rows at midbody.
- *Erythrolamprus mimus* (p. 446) has 15 scale rows at midbody, and each black ring is partly divided by a white band.
- In true coralsnakes (genus *Micrurus*), and some mimics, each red ring is bordered by white or yellow, not by black.
- Large, smooth-scaled black snakes such as *Clelia* species (pp. 420–423) and *Chironius grandisquamis* (p. 335) have light undersurfaces, at least below the head and throat.

Leptodrymus pulcherrimus
Streaked Snake (*Cabeza Verde*)

Least concern

A fast-moving, slender snake with large eyes. Has a cream-colored body, metallic green head, and a pair of bold black stripes that run the length of the head, body, and tail, one on each side of the animal. Total length to 63.0 in (160 cm).

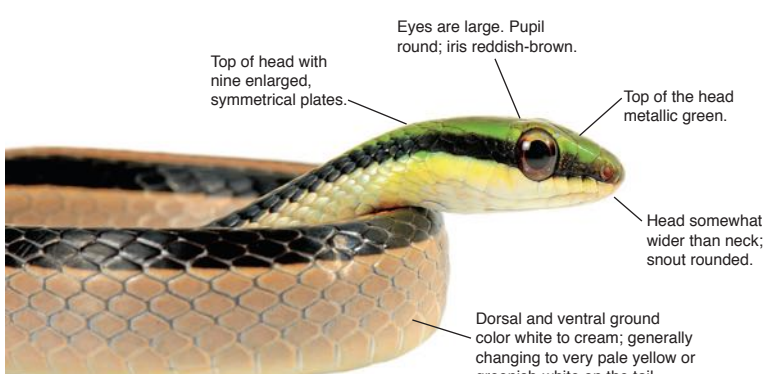
Leptodrymus pulcherrimus occurs in dry habitats on the Pacific slope, from Guatemala to northwestern Costa Rica and the western part of the Central Valley. It also crosses onto the Atlantic slope in Guatemala and Honduras. From near sea level to 4265 ft (1300 m).

Natural history

Leptodrymus pulcherrimus is an agile, diurnal hunter of frogs and lizards. It is most frequently seen moving rapidly across the ground in open areas between vegetation and rocks, but occasionally climbs into low shrubs and small trees. Individuals can be active during the hottest time of day and move with great speed in pursuit of fast-moving whiptail lizards (*Holcosus* and *Aspidoscelis*).

This species is oviparous; egg clutches containing up to four eggs have been reported during the months of May and June. At the elevational limit of its range, *Leptodrymus pulcherrimus* does venture into humid forests, but it is mostly found in areas with a pronounced dry season. Although its reproductive cycle is poorly understood, this species likely does not breed year-round because of the seasonal nature of its environment.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

A very slender snake with a slightly compressed body and a very long tail.

Middorsal area white or cream.

17 rows of smooth scales at midbody.

A pair of dorsolateral black stripes runs from the tip of the snout, through the eyes, and along the length of the body and tail.

Ventral scales number 195–210; 145–152 paired subcaudals; cloacal scute divided.

Leptodrymus pulcherrimus is similar in appearance and biology to parrot snakes of the genus *Leptophis*. Its pattern of black dorsolateral lines on a light background, combined with the metallic green head, is unique among Costa Rican snakes.

Similar species

- *Leptophis* species (pp. 363–373) are similar in appearance and may have light-colored undersides, but never a light middorsal area.
- *Coniophanes piceivittis* (p. 428) is cream with black longitudinal stripes, but its middorsal area is dark brown to black; it never has a green head.

Leptophis ahaetulla

Giant Parrot Snake (*Lora Falsa Gigante*)

Least concern

The largest parrot snake in Costa Rica. Has keeled scales on its body and tail. Dorsum uniform green; venter pale green (in adults) or white (in juveniles). Has a short dark postocular stripe and a poorly defined, very narrow, preocular stripe. Loreal scale absent. Total length to 88.6 in (225 cm), but generally considerably smaller.

Leptophis ahaetulla ranges along the Atlantic slope from Veracruz and Oaxaca, Mexico, south into South America (to northern Argentina and Brazil), and on the Pacific slope from northwestern Costa Rica to Ecuador. From near sea level to 4755 ft (1450 m).

Natural history

This large, all-green parrot snake is widespread throughout the Costa Rican lowlands and foothills. *Leptophis ahaetulla* is a fast-moving, diurnal snake often seen as it forages in bushes and low trees. At night, these snakes sleep coiled on a branch, often several yards/meters above the ground.

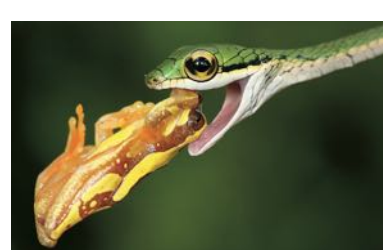
Leptophis ahaetulla feeds primarily on sleeping tree frogs (family Hylidae), which it finds by probing vegetation near wetlands, marshes, ponds, and rivers in forested habitats. It will opportunistically eat other frog species, as well as arboreal lizards, birds, and bird eggs.

These snakes are quick to escape, generally climbing high into a tree at great speed. When cornered, however, they will raise the front of the body off the substrate, open their mouth, and spread their jaw in an impressively wide gape. The snake will quickly turn its head toward the source of the threat and readily strike when the threat is within range. *Leptophis ahaetulla* is not venomous, but a bite by a large individual can certainly be painful. The enlarged rear fangs in this species will leave puncture wounds that usually bleed profusely, indicating the presence of an anticoagulant in its saliva, and some localized swelling and a tingling sensation may be experienced.

Leptophis ahaetulla is oviparous; it is capable of producing clutches of up to five eggs. Eggs of this species have been retrieved from arboreal bromeliads. There is some indication that multiple females occassionally deposit their eggs in a single, communal nest. Young juveniles have been reported during the rainy season, from late April to November, which coincides with the highest density of young frogs. However, timing of reproduction may be different between Pacific and Atlantic slope populations, based on differences in seasonality.

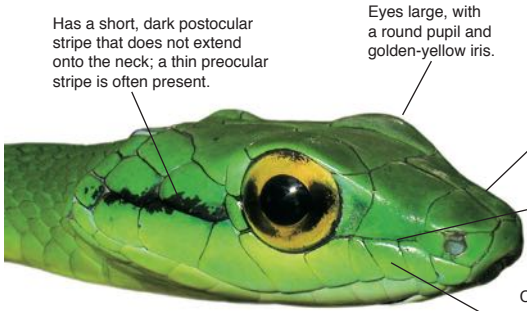
Juveniles of this species differ from adults in having a white venter; they are sometimes confused with other white-bellied *Leptophis* species. Once they reach adult size and attain a green venter, only *Leptophis depressirostris* is similar in overall color pattern. Absence of a loreal scale and the presence of keels on nearly all dorsal scale rows readily identifies this species.

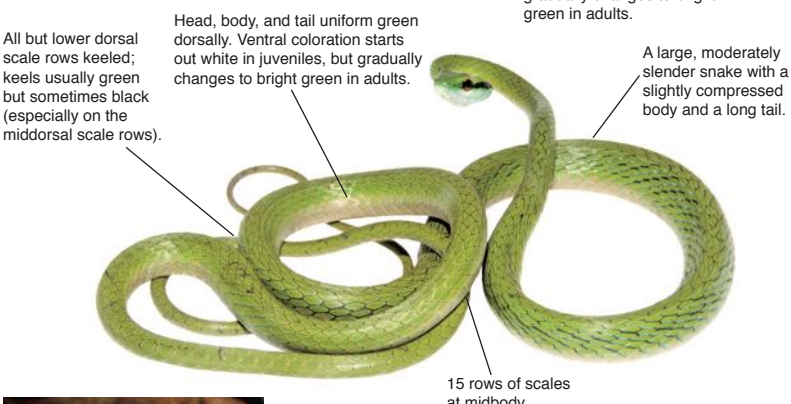
Leptophis ahaetulla has a vast range; several geographically distinct subspecies show considerable variation in color and pattern. Costa Rican populations are assigned to the subspecies *Leptophis ahaetulla occidentalis*, which perhaps warrants full species status. Future studies may find that Costa Rican populations should be considered *Leptophis occidentalis*.

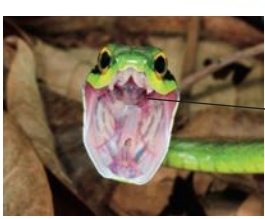


Juvenile *Leptophis ahaetulla* eating an hourglass tree frog (*Dendropsophus ebraccatus*).

Description







Dentition opisthoglyphous; has enlarged rear maxillary teeth that are clearly visible during defensive display.

Ventral scales number 152–182; 153–189 paired subcaudals; cloacal scute divided.

Similar species

- *Leptophis depressirostris* (p. 365) has a green dorsum and venter, has loreal scales, and a short, thin postocular stripes; it lacks a preocular stripe.
- *Leptophis nebulosus* (p. 370) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and has a thin postocular stripe that does not extend far onto the neck; color pattern consists of alternating longitudinal bronze and bright green stripes.
- *Leptophis riveti* (p. 372) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and has a thin, wavy postocular stripe that extends well onto the neck. Dorsum marked with dark green and bronze diagonal bars.
- *Oxybelis brevirostris* (p. 380) has an extremely elongated snout; it also has a very thin black preocular and postocular stripe.
- Other green snakes lack a dark postocular stripe.

Leptophis depressirostris

Satiny Parrot Snake (*Lora Falsa de Ojos Dorados*)

Least concern

A slender, medium-sized snake. Has a green dorsum (sometimes with a brown or bronze middorsal area) and a pale green venter. Dorsal scale rows smooth, except for two scale rows on either side of the middorsal scale row that bear a strong keel. These paravertebral keels are usually marked with black pigment, forming two thin, black lines. Loreal scale present; has a short dark postocular stripe but lacks a preocular stripe. Total length to 61.0 in (155 cm).

Leptophis depressirostris occurs on the Atlantic slope from eastern Honduras to central Panama; on the Pacific slope, it is found in extreme southwestern Costa Rica south to western Ecuador. From near sea level to 4100 ft (1250 m).

Natural history

Leptophis depressirostris is an agile, diurnal snake of forest interiors. It is commonly found in low vegetation in edge situations such as along trails, streams, roads, and clearings in otherwise pristine rainforests. Although often seen in low trees or bushes, it is also regularly encountered on the ground in sun-exposed areas, where it basks and hunts for lizard prey. Anole lizards (family Dactyloidae) and whiptail lizards (family Teiidae) are regularly eaten, but it likely includes other lizards and frogs in its diet. In Rara Avis Rainforest Reserve, individuals of this species are often seen at midday during periods of hot, sunny weather, exploring crevices below large river boulders in search of stream anoles (*Anolis oxylophus*), which are common there.

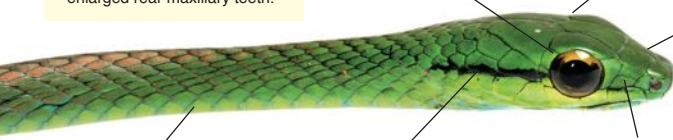
During periods of rain, these snakes seek cover beneath large leaves; when rain and cool weather prevail for longer periods of time, they retreat into hiding places and remain inactive. Individuals that had been equipped with a radio transmitter to track their movement were observed climbing to considerable heights in vegetation, up to almost 16 ft (5 m), as they foraged for prey.

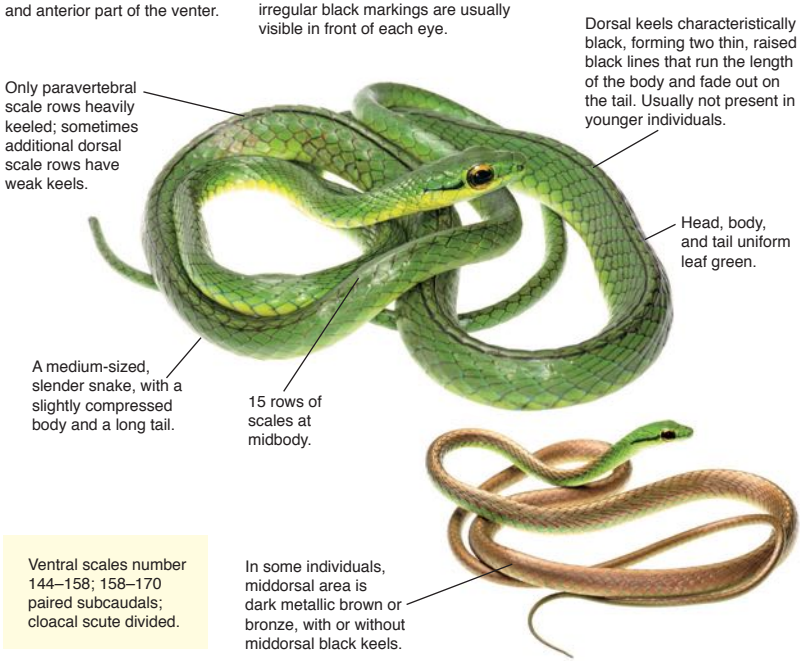
Leptophis depressirostris is not venomous, but it does have enlarged fangs in the back of its mouth. It bites readily in defense, and the resulting small puncture wounds often bleed for a surprisingly long time. Sometimes a slight tingling of the skin around the bite area is felt. The saliva of these snakes likely contains anticoagulants and other substances that normally play a role in the digestion of prey, but which may also affect potential predators. Before biting out of self defense, these snakes first freeze all movement and rely on their cryptic coloration to escape detection. Even if they find themselves in the open, fully exposed on a background that does not match the snake's bright green coloration, this will be their first line of defense. If approached more closely, these snakes will flee rapidly.

Like other species in the genus, *Leptophis depressirostris* is oviparous. An egg clutch, consisting of three eggs, was discovered concealed in a terrestrial bromeliad, while another clutch ascribed to this species was reportedly found in an arboreal bromeliad located several yards/meters above the forest floor.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.





Ventral scales number 144–158; 158–170 paired subcaudals; cloacal scute divided.

Similar species

- *Leptophis ahaetulla* (p. 363) has a green dorsum and venter, but lacks loreal scales; it has a thin preocular stripe that does not reach the tip of the snout, and a short, bold postocular stripe that does not extend onto the neck.
- *Leptophis nebulosus* (p. 370) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and a thin postocular stripe that does not extend far onto the neck; color pattern consists of alternating longitudinal bronze and bright green stripes.
- *Leptophis riveti* (p. 372) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and has a thin, wavy postocular stripe that extends well onto the neck. Dorsum marked with dark green and bronze diagonal bars.
- *Oxybelis brevirostris* (p. 380) has an extremely elongated snout, and a very thin black preocular and postocular stripe.
- Other green snakes lack a dark postocular stripe.

Leptophis mexicanus

Least concern

Mexican Parrot Snake (*Lora Falsa Bronceada*)

Medium-sized and slender, with a bronze dorsum, green head, and white lower surfaces. A yellow-bordered lateral black stripe runs the length of the body and tail; it extends from the dark preocular and postocular stripes. Most dorsal scale rows are lightly keeled. Loreal scale present. Total length to 55.1 in (140 cm).

Leptophis mexicanus occurs in disjunct populations along the Pacific slope, from southern Mexico southward to northwestern Costa Rica and the western Central Valley; from near sea level to 4265 ft (1300 m).

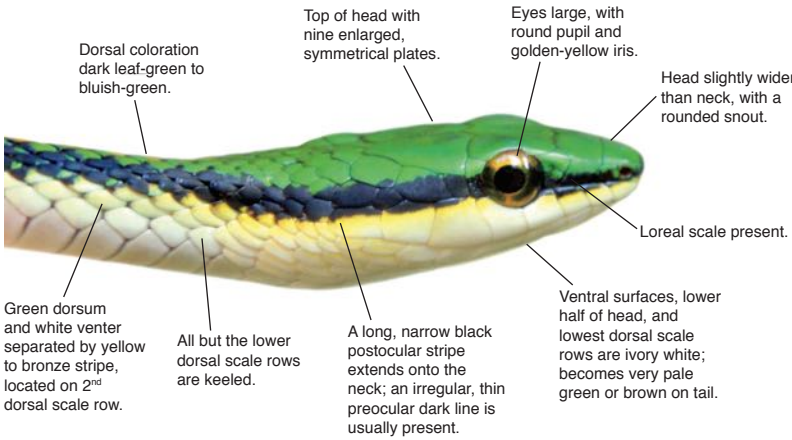
Natural history

This common, agile species prefers relatively dry, open areas. Both a ground-dweller and a tree-climber, *Leptophis mexicanus* is invariably active during the day. It is found in bushes and low trees, where it actively searches for prey. Although food items recorded for this species include tadpoles, lizards, small snakes, and even bird eggs, it mainly feeds on sleeping tree frogs (family Hylidae). At night, when parrot snakes are not active, this ecological niche is filled by such species as blunt-headed vine snakes (genus *Imantodes*) and cat-eyed snakes (genus *Leptodeira*), which feed on awake tree frogs. *Leptophis mexicanus* has been observed eating milk frogs (*Trachycephalus typhonius*), which exude a toxic and extremely sticky secretion from their skin.

Parrot snakes are alert and agile. When discovered, they usually freeze in place and tend to blend in with their surroundings. When approached closer, they usually flee rapidly; when caught or restrained, these snakes will open their mouth widely and gape at the source of the threat. They will readily bite and, although they are not venomous, puncture wounds caused by the enlarged ungrooved fangs in the back of the mouth often result in prolonged bleeding and sometimes localized swelling. This indicates that the saliva of *Leptophis mexicanus* contains anticoagulants.

Leptophis mexicanus is oviparous; in populations outside Costa Rica, it is known to produce clutches of up to six eggs. It inhabits areas with distinct seasonal changes, and eggs are generally deposited during the rainy season to ensure an adequate supply of small froglets when the young snakes hatch.

Description



Ventral scales number 145–161; 141–166 paired subcaudals; cloacal scute divided.

15 scale rows at midbody.

Small juveniles often have a bronze dorsum rather than green; dorsal scales suffused with dark pigment and sometimes show blue markings (especially in very young individuals).

Similar species

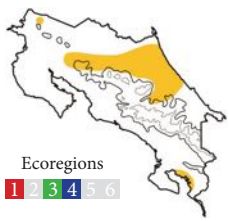
- *Leptophis nebulosus* (p. 370) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and has a thin postocular stripe that does not extend far onto the neck; color pattern consists of alternating longitudinal bronze and bright green stripes.
- *Leptophis riveti* (p. 372) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and has a thin, wavy postocular stripe that extends well onto the neck. Dorsum marked with dark green and bronze diagonal bars.
- *Leptophis ahaetulla* (p. 363) has a green dorsum and venter and lacks loreal scales; it has a thin preocular stripe that does not reach the tip of the snout, and a short, bold postocular stripe that does not extend onto the neck.
- *Leptophis depressirostris* (p. 365) has a green dorsum and venter, loreal scales, and a short, thin postocular stripe; it lacks a preocular stripe.
- *Leptodrymus pulcherrimus* (p. 361) has a cream-colored body, metallic green head, and a pair of bold black lateral stripes.
- *Oxybelis brevirostris* (p. 380) has an extremely elongated snout, and a very thin black preocular and postocular stripe.
- Other green snakes lack a dark postocular stripe.

Leptophis nebulosus

Least concern

Bronze-backed Parrot Snake (*Lora Falsa Enana*)

Medium-sized and very slender, with a bronze dorsum, green head, and white lower surfaces. Dark preocular stripe thin and poorly defined; narrow postocular stripes extends onto neck but does not continue onto body. Most dorsal scale rows lightly keeled; loreal scale absent. Total length to 49.2 in (125 cm).



Leptophis nebulosus occurs in disjunct populations. On the Atlantic slope, it is found from southern Guatemala to central Costa Rica. On the Pacific slope, it occurs in the Guanacaste and Tilarán mountain ranges of northwestern Costa Rica, in the southwestern region of the country, and in adjacent western Panama. Sea level to 4265 ft (1300 m).

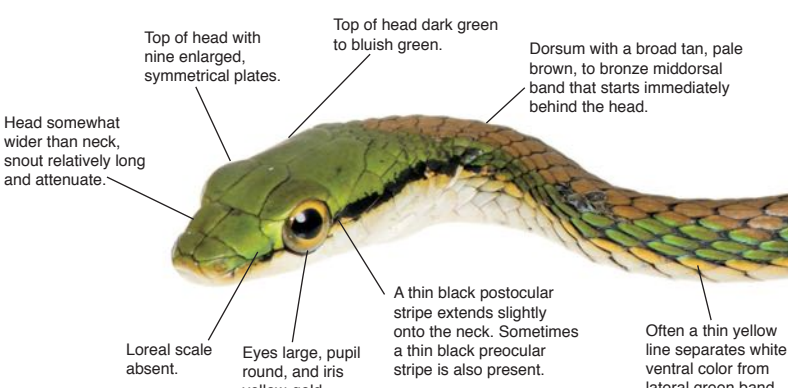
Natural history

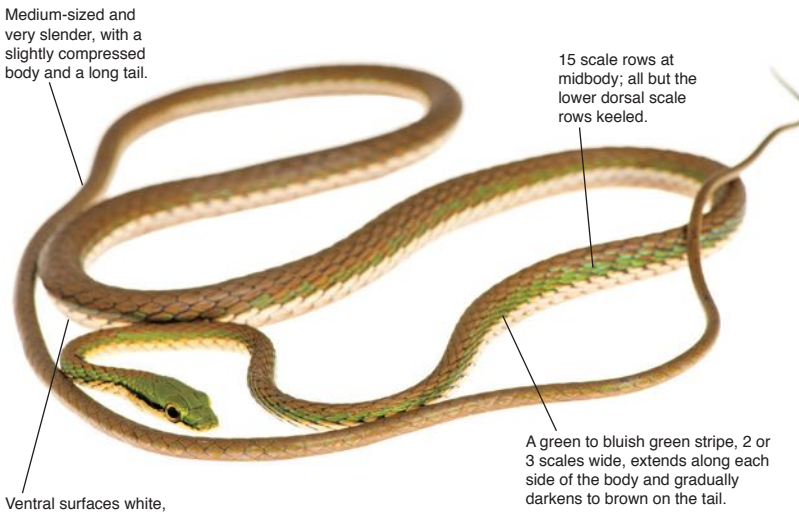
Leptophis nebulosus is an uncommon snake that inhabits undisturbed humid rainforests. It is diurnal and arboreal; usually seen in low vegetation, it does on occasion drop down to the forest floor. This is a highly visual hunter, feeding primarily on frogs. It captures day-active species, as well as tree frogs and other arboreal frogs that sleep during the day. The latter are found by probing through dense vegetation. Limited observations suggest that *Leptophis nebulosus* became far less common after Costa Rican amphibian populations declined sharply in the late 1980s and early 1990s, particularly at middle elevation sites. It is unclear if their populations are rebounding in areas where amphibians are again increasing in numbers.

When discovered, these snakes tend to freeze and rely on their similarity to a vine or twig to avoid detection. When approached, they will escape rapidly. Sometimes individuals engage in a threat display that involves spreading the jaws and exposing a large gaping mouth.

Leptophis nebulosus is oviparous, but details on its reproductive cycle are unknown.

Description





Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 150–160; 146–151 paired subcaudals; cloacal scute divided.

Similar species

- *Leptophis riveti* (p. 372) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and has a thin, wavy postocular stripe that does extend far onto the neck. Dorsum marked with dark green and bronze diagonal bars.
- *Leptophis mexicanus* (p. 367) has a loreal scale, a bold preocular stripe that reaches the tip of the snout, and a bold postocular stripe that is continuous with its dark lateral stripes.
- *Leptophis ahaetulla* (p. 363) has a green dorsum and venter and lacks loreal scales; it has a thin preocular stripe that does not reach the tip of the snout, and a short, bold postocular stripe that does not extend onto the neck.
- *Leptophis depressirostris* (p. 365) has a green dorsum and venter, loreal scales, and a short, thin postocular stripe; it lacks a preocular stripe.
- *Oxybelis brevirostris* (p. 380) has an extremely elongated snout, and a very thin black preocular and postocular stripe.
- Other green snakes lack a dark postocular stripe.

Leptophis riveti

Data deficient

Blue-Green Parrot Snake (*Lora Falsa Azulada*)

Medium-sized and slender, with keeled scales on most of the dorsum. Dorsum bronze to brown, marked with diagonal green or teal bars; individual scales highlighted with sky-blue or turquoise. Top of head green; ventral coloration white or cream. Dark preocular stripe poorly defined; postocular stripe extends somewhat onto neck but does not continue onto body. Loreal scale absent. Total length to 39.4 in (100 cm).

Leptophis riveti is primarily a South American species, occuring in Peru, Ecuador, and Colombia; it is also found in Panama and just reaches extreme southwestern Costa Rica. (This little studied species has also been reported from the island of Trinidad.) From near sea level to 3935 ft (1200 m).

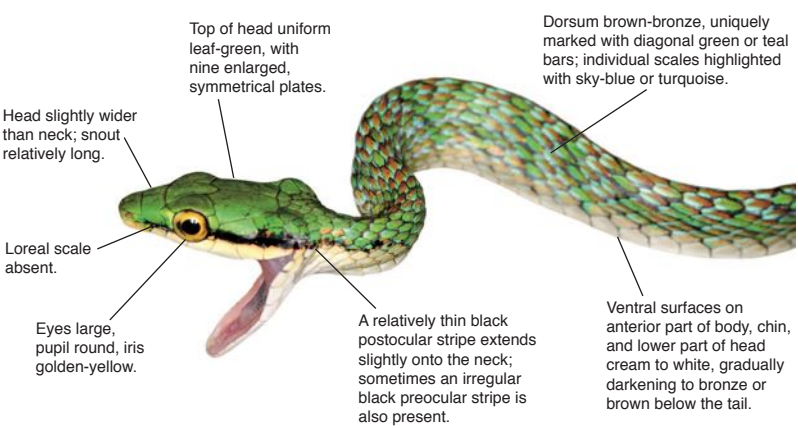
Natural history

A rare species of *Leptophis* that has been recorded just a few times in Costa Rica. This is mostly a South American snake that reaches the northern edge of its distribution range in southwestern Costa Rica. It is similar in morphology and behavior to other species in the genus, but given its rarity not much is known about its natural history.

Leptophis riveti inhabits the interior of undisturbed Pacific lowland rainforests. It is diurnal and arboreal. Although it is mostly seen in low vegetation, it sometimes descends to the ground in pursuit of prey. *Leptophis riveti* likely feeds on frogs, including sleeping tree frogs, but it may also eat small lizards.

Like other *Leptophis*, this species is oviparous, but no additional information on Costa Rican individuals exists.

Description



15 rows of keeled scales at midbody.

Ventral scales number 133–155; 140–145 paired subcaudals; cloacal scute divided.

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Medium-sized and slender, with a slightly compressed body and a long tail.

As in other *Leptophis* species, there appears to be significant variation in coloration and pattern in *Leptophis riveti*. This adult female resembles *Leptophis nebulosus* in its color pattern but scalation characteristics identify it as *Leptophis riveti*. More research is needed to clarify the status of Costa Rican *Leptophis*.

Similar species

- *Leptophis nebulosus* (p. 370) lacks a loreal scale, has a thin preocular stripe that does not reach the tip of the snout, and has a thin postocular stripe that does not extend far onto the neck; color pattern consists of alternating longitudinal bronze and bright green stripes.
- *Leptophis mexicanus* (p. 367) has a loreal scale, a bold preocular stripe that reaches the tip of the snout, and a bold postocular stripe that is continuous with its dark lateral stripes.
- *Leptophis ahaetulla* (p. 363) has a green dorsum and venter and lacks loreal scales; it has a thin preocular stripe that does not reach the tip of the snout, and a short, bold postocular stripe that does not extend onto the neck.
- *Leptophis depressirostris* (p. 365) has a green dorsum and venter, loreal scales, and a short, thin postocular stripe; it lacks a preocular stripe.
- *Oxybelis brevirostris* (p. 380) has an extremely elongated snout, and a very thin, black preocular and postocular stripe.
- Other green snakes lack a dark postocular stripe.

Masticophis mentovarius

Least concern

Neotropical Coachwhip (*Sabanera de Bosque Seco*)

A large, fast-moving diurnal snake with a cylindrical body and smooth scales. Dorsum mostly dull brown; note mottling on the sides of the head and a pattern of indistinct pale stripes on the neck. A sharp-edged ridge over the top of the eye creates the impression of a permanent frown. Total length can reach 98.4 in (250 cm), but most individuals are considerably smaller.

Masticophis mentovarius is widespread in dry habitats on the Pacific slope, from Sonora, Mexico, to northwestern Costa Rica. It also occurs on the Yucatán Peninsula, Mexico, and other isolated, dry habitats on the Atlantic slope of Central America, as well as in Colombia and Venezuela. From near sea level to 1475 ft (450 m).

Natural history

This is a large, powerful, fast-moving snake. It prefers hot, dry terrain. It is generally found in grassy areas on roadsides, along beachfront, and in agricultural fields, but often also occurs in developed areas, in close proximity to humans. It is also known to enter forests, both dry and humid.

This agile snake is a visually oriented hunter that pursues its prey, often at great speed. Fast-moving whiptail lizards in the genera *Aspidoscelis* and *Holcosus* are key prey items, but *Masticophis mentovarius* is known to also feed on snakes, frogs, birds, bird eggs, mammals, and even fish. Juveniles tend to prefer small lizards and even invertebrates. This diurnal, generally terrestrial, snake may occasionally climb onto low vegetation or enter rodent burrows in pursuit of prey. In the seasonally dry environment of northwestern Costa Rica, it may also retreat underground temporarily to avoid the hottest, driest periods of the year.

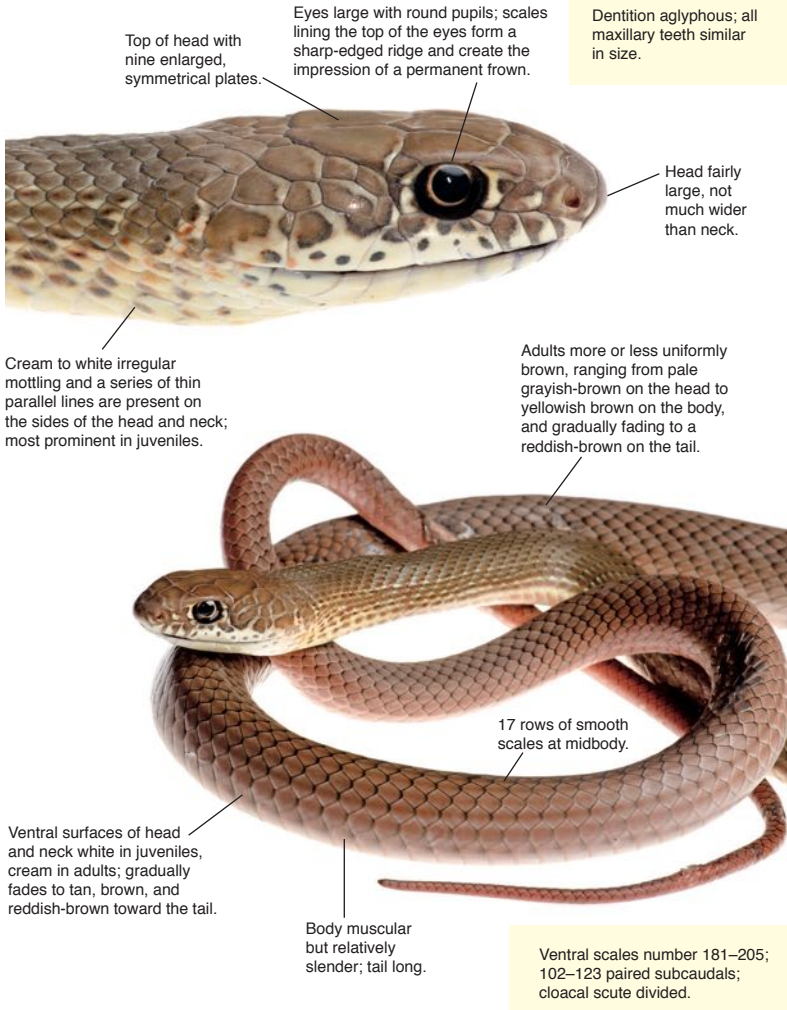
When cornered, these snakes will first try to flee, but if escape is not possible they may perform an impressive defensive display that involves hissing, rattling of the tail against the substrate (which can result in an audible buzz), and striking at the source of the threat. *Masticophis mentovarius* is not venomous, but this powerful snake can deliver a painful bite. It is capable of pseudoautotomy, meaning it can break off sections of the tail to avoid predation; it is not uncommon to observe individuals with an incomplete tail.

Masticophis mentovarius is oviparous; large females can produce clutches containing as many as 30 eggs. Recently hatched individuals have been reported at the beginning of the rainy season.

Some publications list this species as *Coluber mentovarius*.

Note the large eyes and pronounced light mottling on the sides of the head and neck typical of juveniles.

Description



Similar species

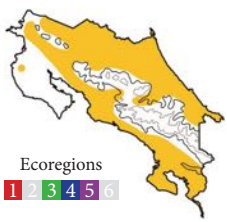
- *Coniophanes fissidens* (p. 426) is smaller, with a pattern of light dorsal stripes and ocelli; each light-colored labial scale has a central dark spot.
- *Drymarchon melanurus* (p. 349) has black diagonal stripes on the head and neck, a pale tan body, and a black tail.
- Juvenile *Mastigodryas melanolomus* (p. 376) have a checkerboard dorsal pattern; adults have a salmon-orange to red venter (cream on Pacific slope) and a pair of pale lateral stripes.
- *Phrynonax poecilonotus* (p. 384) has 19–25 dorsal scale rows that are obliquely arranged; adults generally have a dark head with contrasting, uniform pale lip shields.

Mastigodryas melanolomus

Salmon-bellied Racer (*Corredora Común*)

Least concern

Robust and medium-sized, with a uniform brown or grayish-brown dorsum, marked with a faint gray lateral stripe on each side of the body. An irregular dark eye-stripe is usually present. Lower half of head cream-colored; venter cream (locally on Pacific coast) or salmon-orange (on Atlantic slope). Juveniles with a checkerboard pattern of dark brown squares on a grayish-brown background. Total length to 55.1 in (140 cm).



Mastigodryas melanolomus ranges widely from Sinaloa and Tamaulipas, Mexico, along both slopes of Central America, into northern South America (Colombia); from near sea level to 5740 ft (1750 m).

Natural history

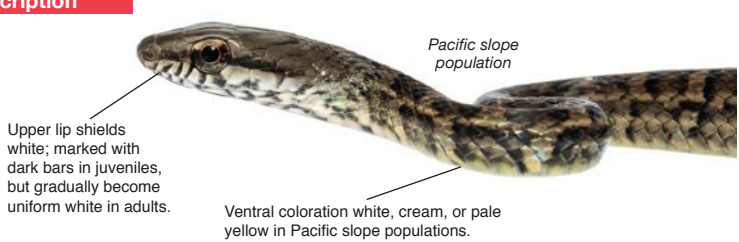
Common and widespread, *Mastigodryas melanolomus* is among the most frequently observed snakes in Costa Rica. This is an agile diurnal species of forest habitats, both pristine and significantly altered. It is mostly terrestrial but climbs adeptly. Adults are regularly seen at night as they sleep coiled on vegetation several yards/meters above the ground, whereas juveniles appear to stay closer to the ground or possibly retreat underground at night. *Mastigodryas melanolomus* mostly feeds on anoles and other types of lizards, but also readily takes frogs, small mammals, and birds. Small juveniles may also consume invertebrate prey, as well as juvenile leaf litter lizards. *Mastigodryas melanolomus* is not venomous; small prey is simply swallowed alive, while larger prey may be constricted first.

These snakes are quick to defend themselves when cornered. They will rattle their tail against the substrate, raise the head off the ground, and strike repeatedly. If grabbed by the tail, *Mastigodryas melanolomus* can break off sections of it to escape predation; many individuals have an incomplete tail (the tail does not regenerate in snakes).

Mastigodryas melanolomus is oviparous and produces clutches of up to nine eggs. Mating appears to take place during the dry season (January through March); eggs and hatchlings have been reported during the wetter months following the dry season. In areas without a pronounced dry period, reproduction may take place throughout much of the year. The striking difference in appearance between juveniles and adults of this species often makes identification a challenge. Juvenile *Mastigodryas melanolomus* are the only Costa Rican snakes with a bold checkerboard pattern; adults are relatively drab in coloration, except for the striking orange to salmon-colored ventral surfaces in Atlantic slope populations. Individuals from the Pacific slope often have a hint of orange in their ventral coloration, but tend to have mostly cream-colored undersurfaces.

This species has been referred to as *Dryadophis melanolomus* in some publications.

Description

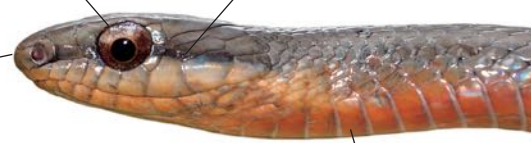


Dentition aglyphous; all maxillary teeth similar in size.

Eyes large, pupil round, and iris dark copper.

A dark brown stripe separates dorsal coloration from pale orange to cream lip shields on side of the head.

Head somewhat wider than neck, with a rounded snout profile.



Atlantic slope population

Adult ventral coloration red, orange, or salmon-pink in Atlantic slope populations.

Adults with relatively uniform grayish-brown to olive-brown dorsal coloration, marked with an indistinct, pale lateral stripe.

Top of head with nine enlarged, symmetrical plates.

A relatively robust, medium-sized snake with a cylindrical body and a long tail.

17 rows of smooth scales at midbody.

Dark bands or squares tend to be larger than pale interspaces on the tail.

small juvenile

Ventral scales number 160–195; 85–110 paired subcaudals; cloacal scute divided.

Chin and lip shields in juveniles white, marked with bold dark brown spots. These spots gradually fade with age (adult chin and lower part of head uniformly colored).

Juveniles with a broad middorsal band of alternating dark and light brown squarish spots. A similar band of alternating dark and light bars or squares is present on either side of the body, creating a checkerboard pattern.

older juvenile

Venter in juveniles white or cream; turns orange later in life in Atlantic slope populations, yellowish-white in Pacific slope populations.

Similar species

- *Coniophanes fissidens* (p. 426) lacks a checkerboard pattern and a salmon-colored belly.
- Juvenile *Masticophis mentovarius* (p. 374) lack a checkerboard pattern; adults lack a salmon-colored belly.
- Several *Dendrophidion* species (pp. 337–348) have a pattern of countershaded bars on the posterior section of their body and longitudinal stripes on the posterior section (never a checkerboard pattern).

Oxybelis aeneus

Brown Vine Snake (*Bejuquilla Café*)

Least concern

An exceedingly slender, long-tailed snake with a characteristically attenuate head shape and very long snout (2 or 3 times the diameter of the eye). Body tan, brown, or gray. Has a striking purple-black lining inside its mouth that is prominently displayed during threat displays. Total length to 66.9 in (170 cm).

Oxybelis aeneus is among the five snake species in the world with the largest distribution range; it occurs from extreme southern Arizona to southern Brazil. In Costa Rica, it is found in a variety of habitats, from near sea level to 4595 ft (1400 m).

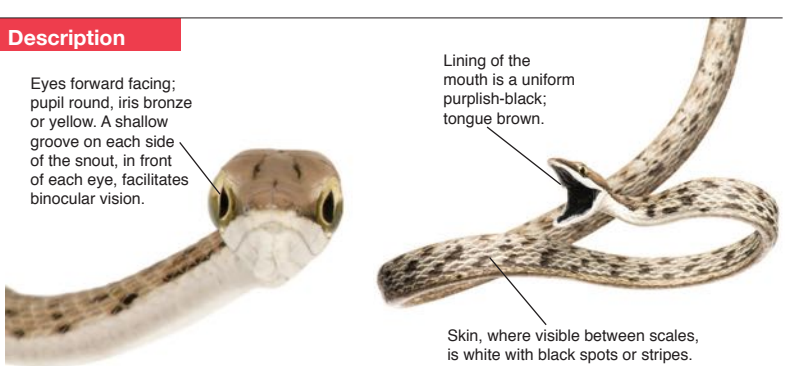
Natural history

Oxybelis aeneus is a common, day-active hunter that inhabits areas of dense vegetation in a variety of habitats, ranging from the vegetation lining beaches to the interior of foothill rainforests, as well as parks and gardens. It actively hunts for prey in bushes or small trees, and also descends to the forest floor, where it crawls around with its head held erect. This snake feeds mainly on lizards, but it also captures frogs, insects, and opportunistically takes small birds and mammals. Prey is immobilized with a mild venom that is administered through enlarged, grooved fangs in the back of the mouth. Bites by this species can cause local swelling and blistering in humans.

When threatened, *Oxybelis aeneus* assumes a defense posture in which the neck is coiled in an S-shape and the mouth is opened, showing the purple-black lining. When pressed further, these snakes may bite, although they often strike with the mouth held closed. Generally, they depend on their camouflage for protection. When trying to escape detection, they remain immobile, typically with the tongue extended. This tongue extension is thought to improve the snake's camouflage and disrupt its body outline; it may also allow the animal to continue monitoring chemosensory information from the surrounding environment. To improve its crypsis, *Oxybelis aeneus* employs a rocking motion superimposed on its forward movement when wind moves the surrounding vegetation.

Oxybelis aeneus is oviparous, capable of producing egg clutches of 6–8 eggs that are usually deposited between late April and June. In areas with a pronounced dry season, reproductive activity may be distinctly seasonal.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Top of head with nine enlarged, symmetrical plates.

Head narrow and very elongated, with a long, pointed snout; distance between eye and tip of snout is at least twice the diameter of the eye.

Throat and chin white; color of ventral surfaces matches that of dorsum.

A dark line runs from the nostril through the eye to the side of the neck, separating the white upper lip from the brown top of the head.

17 rows of keeled scales at midbody.

Medium-sized to large, with an exceedingly slender head, body, and tail.

Tail much longer than body.

Dorsal coloration tan, gray, or brown; uniform, peppered with tiny black and white spots, or marked with a pattern of large dark brown or black spots.

Ventral scales number 177–194; 165–197 paired subcaudals; cloacal scute divided.

Oxybelis aeneus can be very difficult to spot in dense vegetation; its slender body shape and cryptic coloration provide very effective camouflage.

Similar species

- *Oxybelis brevirostris* (p. 380) and *Oxybelis fulgidus* (p. 382) are predominantly green, not brown.
- *Imantodes cenchoa* (p. 464) and *Imantodes gemmistratus* (p. 466) are brown and exceedingly slender-bodied, but have a broad, bluntly-rounded head.

Oxybelis brevirostris

Least concern

Short-nosed Vine Snake (*Bejuquilla de Hocico Corto*)

An extremely slender, long-tailed snake with a characteristically attenuate head shape and long, bluntly rounded snout (at least 2 times the diameter of the eye). Nearly uniformly leaf-green, with a bright yellow-green chin and throat. A narrow black stripe runs along each side of the head, from nostril through eye. Total length to 53.1 in (135 cm).

Oxybelis brevirostris occurs on the Atlantic slope from eastern Honduras to eastern Panama. From near sea level to 3935 ft (1200 m).

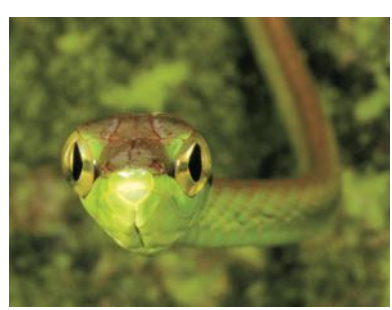
Natural history

A common, exceedingly slender diurnal vine snake of undisturbed forest habitats. Although this can be one of the more common snake species in some areas, its skinny profile and perfectly cryptic coloration make it difficult to spot during the day. Upon discovery, *Oxybelis brevirostris* will remain motionless, like *Oxybelis aeneus* and *Oxybelis fulgidus*, relying on its excellent camouflage. It has been observed to freeze its movements, trusting in its cryptic coloration completely, while sitting in the middle of a road, even though its green coloration makes it highly visible there. When threatened, *Oxybelis brevirostris* lifts the front half of its body off the ground in an S-curve and spreads and compresses its neck region, while opening its mouth in a huge gape. Individuals will attempt to escape first, but readily bite when handled. Because of their large mouth, they are able to break the skin with their rear fangs; often they will proceed to chew on the victim and inject a mild venom that causes local irritation, swelling, a pins-and-needles-like sensation, and sometimes pain.

These snakes are easier to spot at night, when they sleep coiled on vegetation, generally 3–9 ft (1–3 m) above the ground

Oxybelis brevirostris ambushes lizards and frogs on low vegetation and on the ground. When potential prey moves within reach, the snake slithers towards the animal, moving only when the prey moves and freezing when the prey stops moving. The prey is finally caught with a fast, rushing strike and held in the snake's mouth until the venom does its immobilizing work. The rocking motion that is superimposed on the slow, deliberate movements of this species simulates the movement of twigs and vines in the wind.

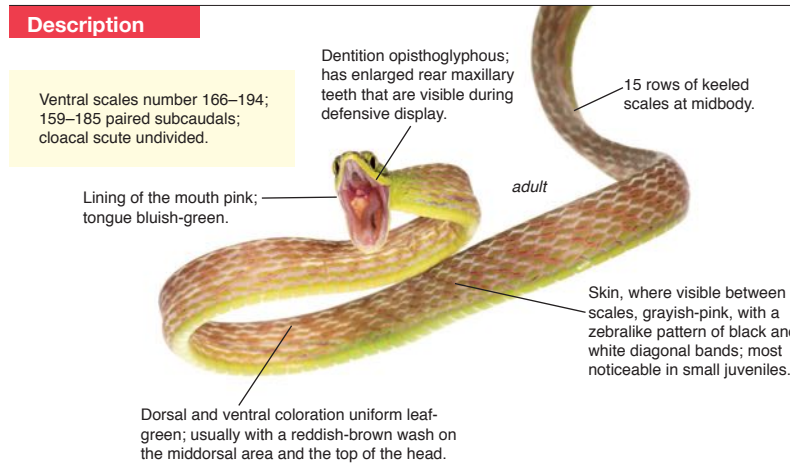
Like other species in its genus, *Oxybelis brevirostris* is oviparous; it produces clutches of up to six eggs. Recently hatched individuals have been detected nearly year-round, and this species may produce multiple clutches throughout the year.

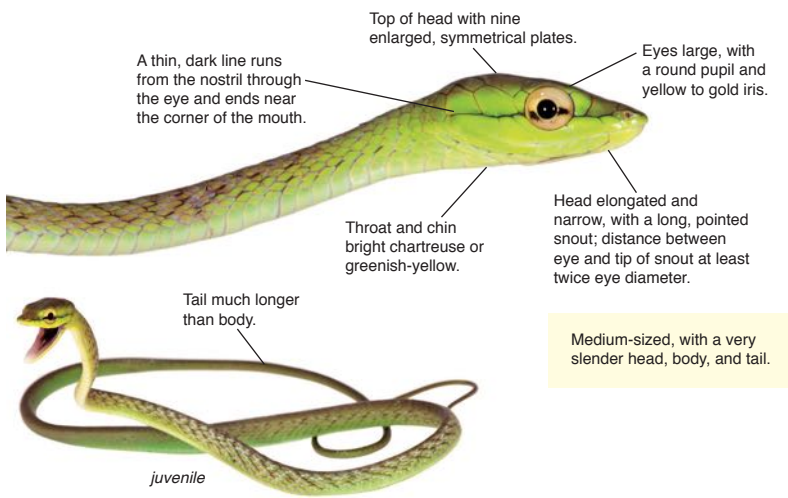


Narrow head shape and protruding eyes facilitate binocular vision.

Description

Ventral scales number 166–194; 159–185 paired subcaudals; cloacal scute undivided.





Medium-sized, with a very slender head, body, and tail.

Similar species

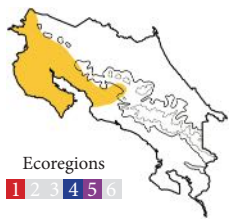
- *Oxybelis fulgidus* (p. 382) is larger, with a more attenuate snout, and has a pair of light stripes along the edges of its venter.
- *Oxybelis aeneus* (p. 378) has a brown or tan color pattern overall and a white chin and throat.
- All other green snakes with a black eye stripe have a rounded, not pointed, snout.

Oxybelis fulgidus

Green Vine Snake (*Bejuquilla Verde*)

Least concern

A large, slender snake with a long tail. Has a narrowly pointed head and a long, protruding, sharp-tipped snout (up to 3 times the diameter of the eye). Uniform bright green, with a narrow light line along each side of the lower body and tail. Total length to 86.6 in (220 cm).



Oxybelis fulgidus occurs on both slopes, from the Isthmus of Tehuantepec, Mexico, to Argentina. Localized in Costa Rica, but ocurs in a variety of habitats; from near sea level to 5250 ft (1600 m).

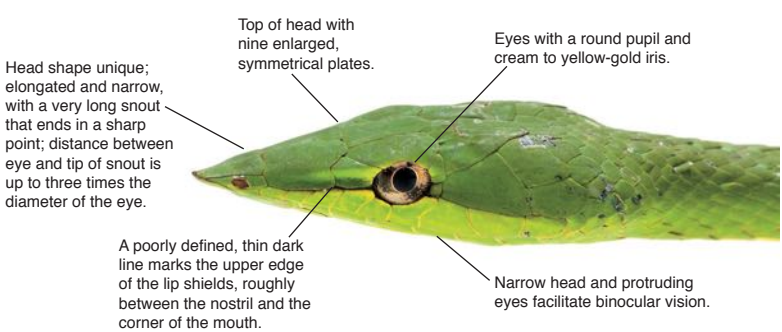
Natural history

Oxybelis fulgidus is relatively uncommon but may be underreported in many areas as it is nearly invisible in densely vegetated habitats. It is tolerant of a variety of habitats, including disturbed habitats. This species is most frequently seen as it perches in small trees or in dense scrubs, in secondary forest or in edge situations (along trails or clearings) in primary forest. It is an ambush hunter, and commonly stays motionless in the same tree or bush for up to several days. It escapes detection due to its vinelike appearance. Even when they are moving through vegetation, their forward progress is masked by a slight back and forth rocking movement that imitates a branch or vine blowing in the wind. *Oxybelis fulgidus* has a green tongue, which is usually extended when these snakes crawl through vegetation.

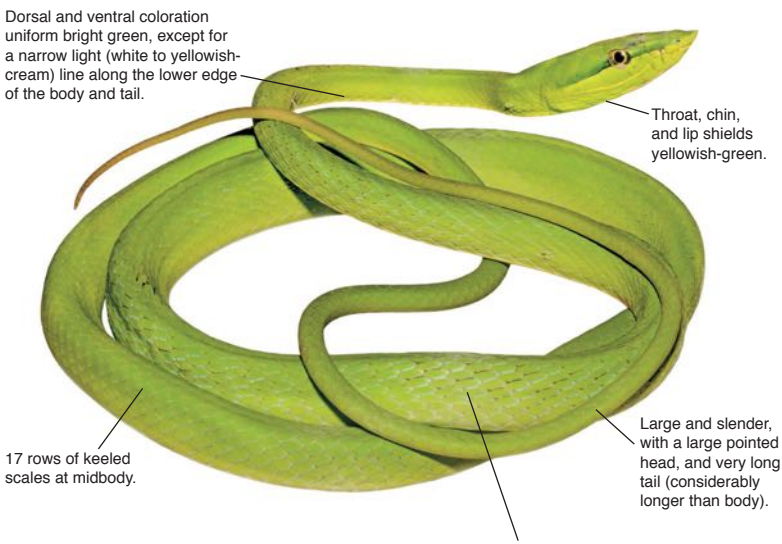
The diet of *Oxybelis fulgidus* consists mainly of different species of lizard, but small and medium-sized birds and small mammals are also eaten. An individual of this species was caught by the author during a large-scale bird monitoring study in El Salvador; the snake had climbed into one of the study's mist net arrays and attempted to eat a ruddy woodcreeper (*Dendrocincla homochroa*) that was already caught in the net. The snake had bitten and killed the bird, using a mild venom. Whether the snake located this relatively immobile bird using visual or olphactory cues is not clear. *Oxybelis fulgidus* is rear-fanged but generaly not inclined to bite; its venom can cause localized pain and swelling in humans.

This species is oviparous; egg clutches of up to 14 eggs have been reported.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.



Oxybelis fulgidus has a pink lining inside its mouth and a strikingly green tongue.

Ventral scales number 198–217; 139–186 paired subcaudals; cloacal scute divided.

Similar species

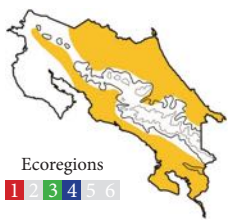
- *Oxybelis brevirostris* (p. 380) is smaller, lacks a pair of light stripes along the edges of its venter, and has a shorter, more rounded snout.
- *Bothriechis lateralis* (p. 576) is a green arboreal pitviper; it has a pair of white lines (similar to that of *Oxybelis fulgidus*) along the venterolateral edges of its body, but has loreal pits, a triangular head, and a prehensile tail.

Phrynonax poecilonotus

Bird-eating Snake (*Pajarera*)

Least concern

Very large and robust, with a compressed body. Highly variable in coloration and patterning, often dark (brown, bluish-gray) above, with yellow undersurfaces; many individuals have red, brown, or orange markings on the dorsum. Dorsal scales are smooth, in 19–25 obliquely arranged rows. Juveniles look very different, with brown, gray, or blue-gray irregular V-shaped crossbands on a cream or yellowish background. Total length to 98.4 in (250 cm).



Phrynonax poecilonotus occurs in humid lowlands and foothills. On the Atlantic slope, it is found in north-central Mexico and throughout Central America; on the Pacific slope, it occurs in southern Mexico, central and southern Costa Rica, and in Panama. It also ranges into South America (to Peru, Bolivia, and Brazil). From near sea level to at least 4265 ft (1300 m).

Natural history

Phrynonax poecilonotus is a common diurnal inhabitant of a variety of habitat types, ranging from primary rainforest to plantations, and even human settlements. It is generally seen on the ground in open areas or on low vegetation in forested areas. This species is fast and agile and is an adept climber; it has been observed scaling waterfalls, rocky outcroppings, and tree trunks with great speed.

When threatened, these snakes employ an impressive defensive display that includes vibrating the tip of the tail, flattening the head, puffing up the neck and the front of the body, gaping, and striking at the source of the threat. Although *Phrynonax poecilonotus* is non-venomous and harmless to humans, a bite by a large individual can still be painful.

Juveniles flatten their head, spread their jaws, and often inflate the neck region to appear bigger. This behavior creates the impression that the snake has a triangular head. In combination with the white venter that is marked at regular intervals with reddish-brown blotches, juvenile *Phrynonax poecilonotus* can appear convincingly like an eyelash pitviper (*Bothriechis schlegelii*), and their behavior may constitute a form of mimicry.

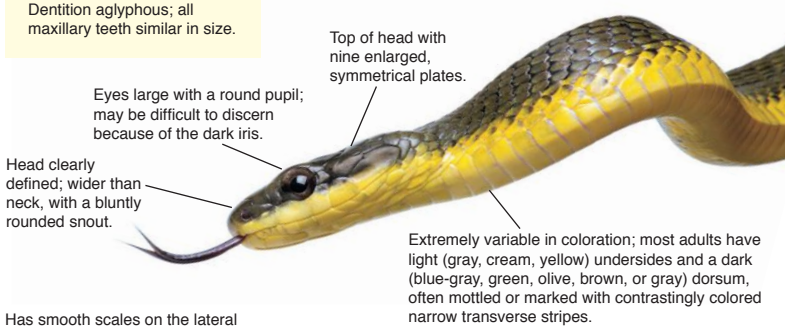
Phrynonax poecilonotus is an adaptable species but appears to have a somewhat limited diet compared to other large constrictors. Its preferred prey consists of birds and their eggs, as well as bats. Juveniles tend to eat more lizards, but even adults will opportunistically eat lizards and small mammals. A large individual was observed raiding a colony of white-collared swifts (*Streptoprocne zonaris*) located in rocky crevices behind a large waterfall. The snake moved methodically from nest to nest, eating several young. It waited in one of the nest cavities and captured one of the adults as it returned to its nest to feed the young. Clearly, a single snake can have a significant impact on the breeding success of a colony of nesting birds.

Phrynonax poecilonotus is oviparous and produces egg clutches that may contain more than 10 eggs. Incubation lasts upward of 4 months, and young juveniles are commonly seen between January and May. Even though juveniles all appear very similar, adults are highly variable in their coloration; different adult colorations may appear within a single clutch of eggs. Until relatively recently, this species was known as *Pseustes poecilonotus*, and it is included as such in most literature.

Description

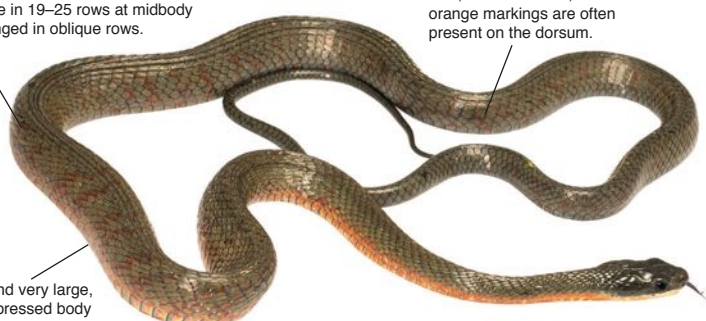
Ventral scales number 206–220; 117–147 paired subcaudals; cloacal scute undivided.

Dentition aglyphous; all maxillary teeth similar in size.



Has smooth scales on the lateral surfaces, but several of the middorsal scale rows are distinctly keeled; dorsal scales are in 19–25 rows at midbody and arranged in oblique rows.

Red, reddish-brown, or orange markings are often present on the dorsum.



Robust and very large, with compressed body and long, whiplike tail.

young juvenile

older juvenile

Juveniles and young adults have a pattern of brown, gray, or blue-gray irregular crossbands on a cream or yellowish background, arranged in a V-shape or crescent shape.

Extreme individual variation as well as a pronounced ontogenetic color change can make it difficult to identify these snakes.

Similar species

- *Spilotes pullatus* (p. 394) is most similar in size, shape, and behavior but differs in having a pattern of oblique or transverse black and cream bands on its body; it has 14–18 rows of keeled dorsal scales.
- *Drymarchon melanurus* (p. 349) has black diagonal stripes on its head and neck.
- *Masticophis mentovarius* (p. 374) has fewer scale rows, which are all smooth and not arranged obliquely.
- *Mastigodryas melanolomus* (p. 376) has a salmon-orange to red venter (cream in Pacific populations), and a faint lateral light stripe.
- Juveniles may superficially resemble the venomous *Bothriechis schlegelii* (p. 582), but they lack the characteristic pointy projections on the upper eyelid (that resemble eyelashes) and never have loreal pits.

Rhinobothryum bovallii

Least concern

False Tree Coral (*Cabeza de Tortuga*)

A medium-sized arboreal, nocturnal snake. Has a laterally compressed body, a prominent pattern of red, black, and white rings that completely encircle the body, and unique light-outlined scales on the top of the head. Total length to 69.3 in (176 cm).

Rhinobothryum bovallii has been found in isolated populations on the Atlantic slope, in extreme southern Honduras, through Central America, and to Ecuador; from near sea level to at least 2330 ft (710 m).

Natural history

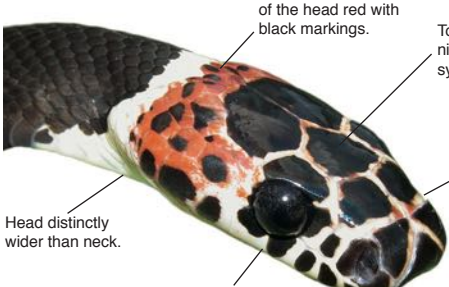
Rhinobothryum bovallii is infrequently seen and its biology is poorly known. It is nocturnal and generally hunts on the forest floor and in low vegetation, although a shed skin of one individual was recently found in the top of a large rainforest tree at a height of 95 ft (29 m) above the ground. This observation confirms an earlier supposition that *Rhinobothryum bovallii* spends significant time in the canopy, which would explain why there are so few sightings of this beautiful snake.

Based on limited observations, the preferred prey for this species appears to be lizards, especially anoles that are caught at night while they sleep, but possibly other reptiles as well as birds. Observations on Panamanian individuals suggest that *Rhinobothryum bovallii* may also prey on bats. This is an opisthoglyphous snake with a mild venom that it uses to immobilize prey. When threatened, it employs defensive behavior that consists of loud hissing, vigorous rattling of the tail, and, occasionally, strikes with the mouth closed.

This is a species of relatively undisturbed humid lowland forest; it has also been observed in areas with small dwellings that are surrounded by intact forest. Loss of primary forest is likely the biggest threat to this species.

Rhinobothryum bovallii is oviparous; it reportedly produces clutches of up to 6 eggs, which require about 4 months to hatch.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Neck, body, and tail marked with a series of red, white, and black rings that completely encircle the body; each red band bordered on each side by a white band.

19 rows of scales at midbody; smooth on front of body, keeled towards tail.

Red scales marked with black pigment to varying degrees; white scales generally immaculate.

Body slender and laterally compressed, tail relatively short (shorter than standard length).

Ventral scales number 239–246; 115–125 paired subcaudals; cloacal scute divided.

Tail with tricolor pattern.

Similar species

- *Oxyrhopus petola* (p. 488) has a similar body shape but always has a bicolored color pattern (black and cream, or orange and black), never a tricolored (red, white, and black) pattern.
- True coralsnakes (*Micrurus* species), pp. 549–561, have a cylindrical body and a very short, bicolored tail.
- Other similarly colored snakes (e.g. *Lampropeltis*, *Erythrolamprus*) never have the extremely large nostrils and light-outlined, black head shields typical of this species.

Scaphiodontophis annulatus

Least concern

Variable False Coral (*Falsa Coral Variable*)

A medium-sized coralsnake mimic with an extremely long tail. Color pattern is highly variable. Red, yellow, and black rings do not continue onto the venter; the ringed pattern may be interrupted by sections of uniform grayish-brown, marked with dark longitudinal stripes. Eyes large, with a copper iris. Total length to 35.4 in (92 cm), females usually larger than males; tail often incomplete.

Scaphiodontophis annulatus ranges from Oaxaca and southern Tamaulipas, Mexico, to northern Colombia, at elevations from near sea level to 2870 ft (875 m). In Costa Rica, it is found throughout the Atlantic lowlands, as well as in the Pacific southwest. An isolated record exists from Tenorio Volcano in Guanacaste Province, Costa Rica.

Natural history

The genus *Scaphiodontophis* currently contains a single, highly variable species, *Scaphiodontophis annulatus*. The extreme variability of this species throughout its entire distribution range has led to a long history of taxonomic confusion and several different species were once thought to exist. A recent study demonstrated that all color and pattern varieties in these snakes can be regarded as traits of a single, extremely variable, species. Nevertheless, some authors still consider populations from northern Central America to be a different species, *Scaphiodontophis venustissimus*.

Scaphiodontophis annulatus is primarily an inhabitant of the leaf litter in rainforests, but it has also been found in cut-over areas and on plantations. There are indications that this snake spends at least part of its life in underground burrows. Individual *Scaphiodontophis annulatus* are typically found hidden beneath the leaf litter, with the coral-ringed portion of the neck and the head exposed, elevated, and motionless. In this position, they wait for suitable prey within range. In Costa Rica, the diet of this species consists almost exclusively of the small skink *Scincella cherriei,* but gymnophthalmid lizards, anoles, and frogs are reported as prey items elsewhere. The lizards are grabbed with a lightning strike and swallowed alive with astonishing speed. Observations on the prey-handling behavior of this species revealed that the average time between capture of a litter skink (*Scincella cherriei*) and the disappearance of the lizard's tail tip down the snake's throat is 7.73 seconds, with the fastest feeding lasting only 2.8 seconds. It can accomplish this feat because of its unique dentition. Its teeth are short, blunt, and shovel-like, and are attached to the jawbone by a functional hinge that allows the teeth to be folded backward when the snake's prey moves towards the esophagus. However, the teeth lock into place once the prey passes, or when it attempts to struggle out of the snake's mouth. Such highly specialized jaw and tooth structures are adaptations for catching and handling slippery, hard-bodied prey.

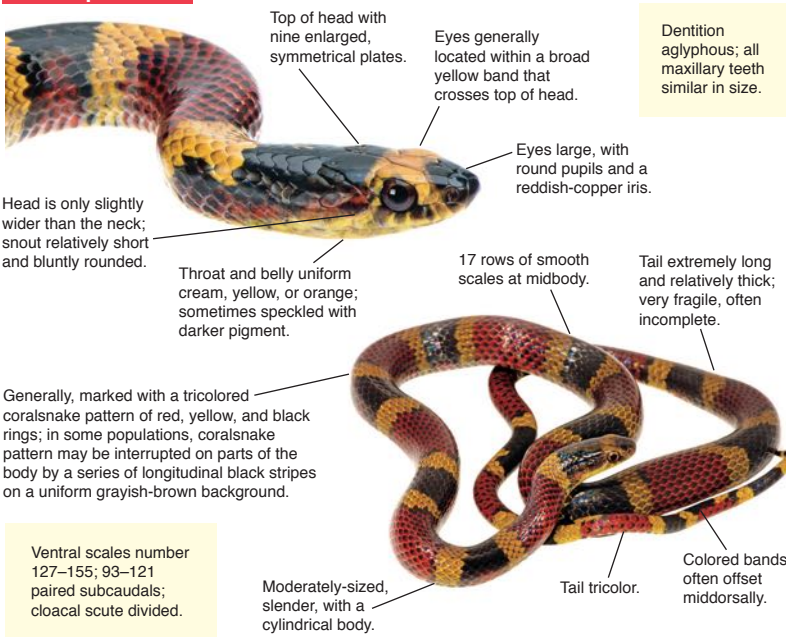
Scaphiodontophis annulatus is a fast-moving, erratic snake. It never attempts to bite, but when seized by a predator, or merely touched, it thrashes its tail and body; it can deliberately break off a portion of its tail if restrained, a mechanism called pseudoautotomy that is unusual among snakes. The presence of multiple fracture planes in the long tail of *Scaphiodontophis annulatus* allows for several breaks. This is an adaptation that is primarily found in a small assemblage of leaf litter snakes. Snakes of the genera *Rhadinaea*, *Rhadinella*, *Urotheca*, *Enuliophis*, and *Enulius* have similar long, fragile tails and have evolved a comparable strategy to avoid predation. Unlike lizards and salamanders, whose lost tails are completely replaced by a new one, snakes do not regenerate their tail. The separated piece of tail will continue to wriggle and move for a few minutes, distracting the predator that grabbed it and granting the snake valuable time to escape.

Scaphiodontophis annulatus is not venomous but is generally regarded as a mimic of the dangerously venomous coralsnakes of the genus *Micrurus*. Its coralsnake-like patterning on parts of the

body may startle potential predators and increase the chance for escape.

Scaphiodontophis annulatus has been observed to lay clutches of up to 12 eggs in decomposing leaf litter, under rotten logs, or in depressions in the forest floor. Apparently, males sometimes display aggression toward one another when competing over a female.

Description



Small juveniles appear nearly all black, with a light head.

Older juveniles have a distinct white or cream head cap, followed by a broad black neck band. With age, black pigment gradually becomes more concentrated on just the tips of the red body scales, and red bands become increasingly prominent.

Similar species

- On *Micrurus* species (*alleni, clarki, mosquitensis, nigrocinctus*) the tricolored, ringed pattern continues onto the venter to completely encircle the body; all have small eyes and a black iris.
- In *Tantilla supracincta* (p. 410), the red bands are bordered on both sides with a black band.
- *Lampropeltis* species (pp. 357–360) also have red bands that are bordered by a black band on each side.
- *Oxyrhopus petola* (p. 480) is generally two-toned (orange and black); the entire top of the head, including all the enlarged plates, are included in the black head cap.

Scolecophis atrocinctus

Least concern

Ringed Centipede Snake (*Comecienpiés*)

A uniquely colored small terrestrial snake with alternating black and light-colored rings that completely encircle the body; the middorsal area of each light ring is prominently marked with a bright orange blotch. Total length to 19.7 in (50 cm).

Scolecophis atrocinctus inhabits the relatively dry Pacific lowlands and foothills of Central America, from Guatemala to Costa Rica. In Costa Rica it occurs in the northwestern region of the country and in the western Central Valley; from near sea level to 2300 ft (700 m).

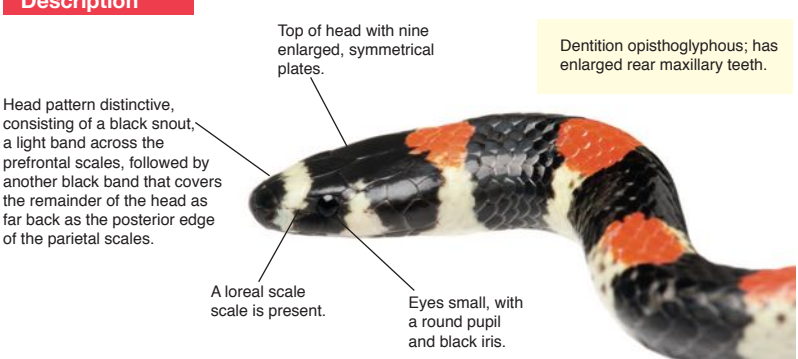
Natural history

Scolecophis atrocinctus is the only species in its genus. It is a poorly known species that is infrequently seen. It is seemingly active during the day and hunts mostly at dusk and dawn. Although there is one documented case of an individual climbing a tree, they are generally terrestrial and are found in the leaf litter substrate of relatively open forests. It is most commonly found when lifting cover objects (logs, rocks, etc.). *Scolecophis atrocinctus* preys almost exclusively on large centipedes, which are also found below such cover objects. This species shows many similarities in its biology to members of the genus *Tantilla*, which also specialize on hunting centipedes.

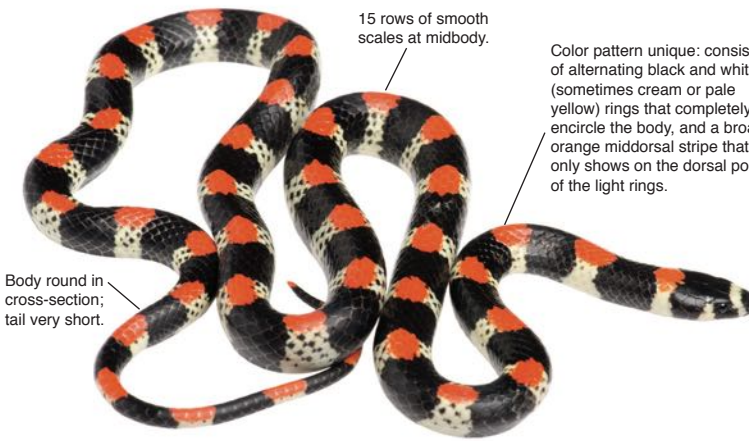
When threatened, these inoffensive snakes don't attempt to bite but rather thrash their body in an unpredictable manner, very much like the defensive behavior seen in venomous coralsnakes of the genus *Micrurus*. This behavior, combined with the striking color pattern of this species, may help reinforce its similarity to potentially dangerous coralsnakes and provide additional protection from predators.

Scolecophis atrocinctus is oviparous; it produces clutches of up to seven eggs in January and February. Hatchlings, whose coloration is similar to that of adults, have been reported from April and May.

Description



Ventral scales number 181–196; 46–53 paired subcaudals; cloacal scute divided.



Scolecophis atrocinctus is a strikingly colored snake. The banded pattern effectively obscures the shape of its body, while the bright orange spots may serve to deter predators.

Similar species

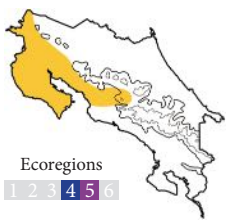
- While several snakes in Costa Rica have a similar coralsnake-like pattern, only *Sibon anthracops* co-occurs with *Scolecophis atrocinctus*. *Sibon anthracops* (p. 504) has large eyes with vertically elliptical pupils and has a black head cap that covers the entire snout and the top of the head; it lacks the light bar across the prefrontal scales typically seen in *Scolecophis atrocinctus*.

Senticolis triaspis

Least concern

Neotropical Ratsnake (*Ratonera Centroamericana*)

This is a relatively slender, diurnal snake. It has an elongated head with a long, bluntly rounded snout and large eyes with round pupils. The 29–39 dorsal scale rows surrounding the body are unique among Costa Rican snakes. Adult coloration is uniform tan to golden brown, sometimes showing faint remnants of the juvenile pattern of dark saddles on body and tail. Total length to 50.0 in (127 cm).



Senticolis triaspis ranges from the extreme southwestern US along the Pacific slope to northwestern Costa Rica and parts of the Central Valley. On the Atlantic slope, it occurs from Tamaulipas, Mexico, to northern Nicaragua; there are also isolated records from southeastern Nicaragua and the Atlantic foothills of northern Costa Rica. It may be more widespread on the Atlantic slope than current records indicate. From near sea level to 4920 ft (1500 m).

Natural history

The monotypic genus *Senticolis* contains a single species, *Senticolis triaspis*, which was formerly included in the North American ratsnake genus *Elaphe* but differs in details of its hemipenis morphology.

Throughout Central America and Mexico, *Senticolis triaspis* is found in a variety of habitats; it often occurs in seasonally dry forests but also appears in moist foothills and heavily altered areas. It readily enters areas of human settlement, including the city of San José, and can be found in people's homes and seen crossing roads at night. Nevertheless, this is a relatively uncommon species that is more often encountered in the Pacific northwest than at higher elevations; it is rare on the Atlantic slope.

In areas with a pronounced dry season, *Senticolis triaspis* is mostly nocturnal or crepuscular during the driest and hottest months, but in other areas individuals can be seen hunting during the day. This species is terrestrial but climbs readily and has been seen ascending trees to inspect crevices for potential prey. *Senticolis triaspis* mainly eats lizards, small rodents, and birds, which are killed by constriction.

These are fast and irascible snakes that are quick to escape, but do not hesitate to defend themselves when cornered. Their defensive behavior includes coiling the front of the body in an S-shaped curve, elevating the head slightly above the ground, and striking at the source of the threat. Like many other colubrid snakes, *Senticolis triaspis* vibrates the tip of its tail when threatened, producing an audible buzz if the snake is in leaf litter.

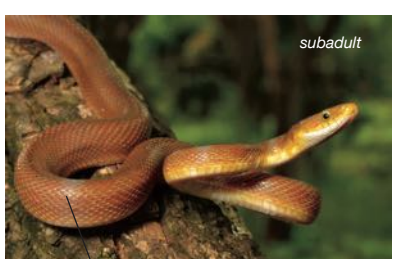
Senticolis triaspis is oviparous and produces clutches of up to eight eggs.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 247–264; 107–115 paired subcaudals; cloacal scute divided.

Juvenile coloration silver-gray to brownish-gray, boldly marked with 58–78 squarish middorsal blotches on the body and tail, and a series of roughly circular blotches on each side of the body; markings are reddish-brown bordered by a black margin.



Juvenile color pattern fades over time; subadults tend to have a nearly uniform tan dorsum that may reveal faint traces of the spotted pattern.

Similar species

- *Drymobius rhombifer* (p. 355) resembles juvenile *Senticolis triaspis* but has far fewer (17) dorsal scale rows.
- *Masticophis mentovarius* (p. 374) has a shorter snout and distinctive frown; it has only 17 dorsal scale rows.
- *Epicrates maurus* (p. 321) has a high number of dorsal scale rows but has vertically elliptical pupils and the scales on top of its head are small and fragmented.

Spilotes pullatus
Tiger Ratsnake (*Mica*)

Least concern

A very large, slender snake with a distinctive black and cream "tiger stripe" pattern on its head, body, and tail. Body somewhat laterally compressed, with 14–18 rows of large, keeled dorsal scales. Total length can exceed 106.3 in (270 cm).

Spilotes pullatus is common and widespread throughout much of Central and South America, from Mexico to Bolivia, Peru, and Argentina. In Central America, it inhabits low and moderate elevations of both the Atlantic and Pacific slopes; from near sea level to 4495 ft (1370 m).

Natural history

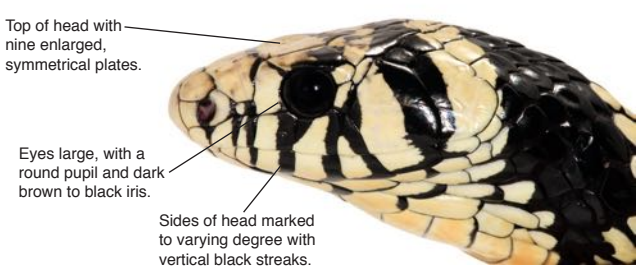
This is a common diurnal species that occurs a variety of habitats, including dense rainforest, swamps, and dry savannas. It seems to prefer open areas such as stream banks, trails, and forest edges, where the vegetation cover is broken. This species is frequently associated with vegetation along streams and rivers that bisect forested areas. *Spilotes pullatus* is active both on the ground and in trees; it is fast-moving and agile and climbs exceedingly well. Large individuals tend to bask in treetops in the morning and have been observed in the canopy as high as 100 ft (30 m) above the ground.

The contrasting pattern of this snake perfectly breaks up its body outline in the light and dark mosaic of the forest understory, and even large individuals are sometimes only noticed once they start moving. Most individuals tend to flee when discovered, but large adults may stand their ground and can employ an impressive threat display. The neck and the front of the body are inflated and lifted off the ground; the tail tip is rattled simultaneously, creating an audible buzz. When further threatened, the snake will strike repeatedly. Although *Spilotes pullatus* is non-venomous and harmless to humans, a bite by a large individual can be quite painful.

This species hunts actively for small mammals, but also eats lizards, birds, and bird eggs. Small prey are generally crushed to death, but not necessarily constricted with body coils. A large individual was reported to have killed and swallowed an adult Mexican tree porcupine (*Coendu mexicanus*), only to be killed itself when the porcupine's quills penetrated its intestinal tract, internal organs, and even its skin.

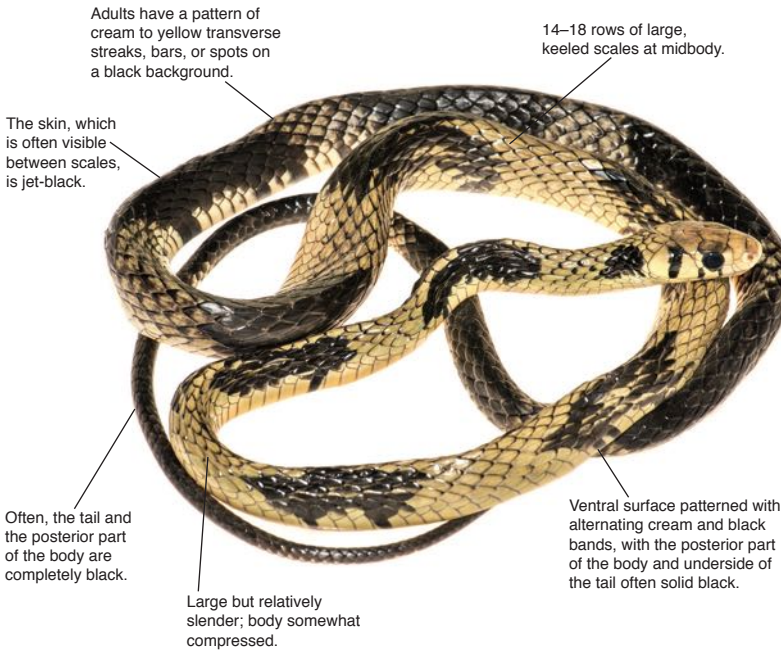
Spilotes pullatus is oviparous; clutches of 7–10 eggs have been reported. The eggs are generally deposited during the dry season (January–March); hatchlings appear roughly four months later, at the onset of the rainy season.

Description



Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 200–226; 115–134 paired subcaudals; cloacal scute undivided.



There is a gradual ontogenetic change in coloration; juveniles typically have a defined banded pattern that becomes more diffuse with age.

Extent and shape of the dark markings is extremely variable. When flattening the neck during a defensive display, the black skin is exposed, thus increasing the size of the dark body markings.

Similar species

- *Phrynonax poecilonotus* (p. 384) is similar in body shape and size but has 19–25 rows of smooth, obliquely arranged dorsal scales with keels only on the middorsal scale rows; it never has a black and cream "tiger stripe" color pattern.
- *Chironius grandisquamis* (p. 335) is jet-black as an adult; its body is triangular in cross-section, with a sharp middorsal keel, and only 10 rows of dorsal scales.
- *Lampropeltis micropholis* (p. 359) is generally tricolored (red, white, and black), but may darken to become nearly all-black; it generally has 21 dorsal scale rows and never a color pattern of black and white or cream tiger stripes.
- *Drymarchon melanurus* (p. 349) has black diagonal stripes on its head and neck only.

Stenorrhina degenhardtii

Least concern

Southern Scorpion-eater (*Alacranera Sureña*)

A stocky, medium-sized snake with a robust, cylindrical body and a small head that is scarcely wider than its neck. Has a distinctively enlarged rostral scale that gives the tip of the snout a somewhat upturned, pointed appearance, and a very short tail that ends in a sharp nail-like tip. Color pattern quite variable, generally uniform or with dorsal blotches, not striped. Total length to 31.5 in (80 cm).

Stenorrhina degenhardtii ranges from Veracruz, Mexico, southward to northern Venezuela on the Atlantic slope, and from central Costa Rica to western Ecuador on the Pacific slope; from near sea level to 5415 ft (1650 m).

Natural history

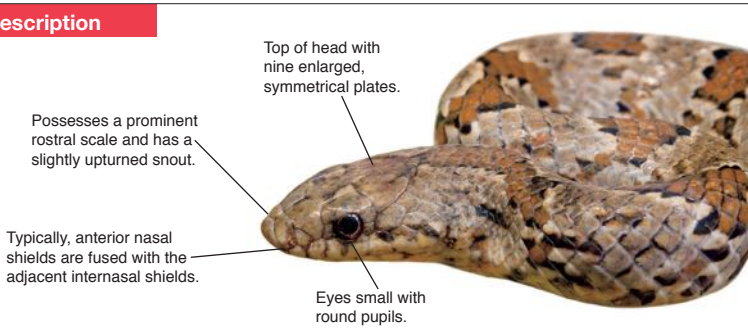
The genus *Stenorrhina* includes two species of snake that are unusual because of their preferred prey items: spiders and scorpions. Both species are found in Costa Rica. The more widespread of the two, *Stenorrhina degenhardtii*, is a somewhat uncommon species. It is diurnal and inhabits relatively open situations and habitat edges surrounded by lowland and premontane forest. It is a very docile species, and when handled will usually attempt to hide its head under body coils. These are powerful, stocky snakes that will try to break free by pushing their shovel-shaped snout between fingers. Interestingly, they often use their short tail and the sharp terminal tip as an anchor.

This snake probably spends considerable time in burrows or in other fossorial or semifossorial settings. It feeds on large insects and their larvae and is famous for its habit of preying on scorpions and large spiders, including tarantulas. *Stenorrhina degenhardtii* has enlarged rear fangs that can deliver a mild venom. It is apparently immune to the venom of its prey species.

Stenorrhina degenhardtii is oviparous; it produces clutches of up to 17 eggs. Eggs have been found inside the nest of a colony of leafcutter ants (*Acromyrmex octospinosus*); most egg clutches have been discovered during the dry season (January and February).

This species displays two distinct color morphs: a uniformly colored variety with a solid brown, gray, or reddish coloration, and a light gray to tan variety that is boldly marked with a series of dorsal saddle spots. The uniformly colored morph is only found on the Atlantic slope, whereas the spotted form may occur on both sides of the country. It is not clear what the evolutionary advantage of either pattern is.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 153–168; 30–50 paired subcaudals; cloacal scute divided.

Coloration highly variable; can be uniform brown, reddish-brown, or gray, but some individuals are boldly marked with dorsal blotches.

17 rows of smooth scales at midbody.

Relatively stocky, with a small head and short robust tail which ends in a sharp, nail-like tip.

Ventral color generally slightly paler than dorsal color; each ventral scale has a dark posterior edge and often a dark central spot, collectively forming a midventral stripe (most prominent in juveniles).

Some individuals have 20–30 squarish, dark saddle-blotches that are outlined with light pigment. These dorsal blotches alternate with similarly colored, but smaller, lateral blotches.

This individual has dark irregular crossbands and blotches on a reddish-brown background. This color pattern occurs in the same area as individuals that are uniformly colored. The dark markings may be a remnant of a juvenile color pattern.

Similar species

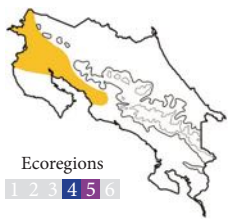
- *Stenorrhina freminvillii* (p. 398) does not overlap in range. It usually has a pattern of longitudinal black stripes on a silvery-gray background, but some individuals have a uniform reddish coloration; the venter is immaculate.
- *Hydromorphus concolor* (p. 462) resembles the uniform morph of *Stenorrhina degenhardtii*; it differs in having only a single prefrontal scale and a single internasal scale (both are paired in most other snakes).
- *Drymobius rhombifer* (p. 355) resembles the spotted morph of *Stenorrhina degenhardtii*. It has keeled scales, a long tail, and its head is distinctly wider than its neck.

Stenorrhina freminvillii

Least concern

Northern Scorpion-eater (*Alacranera Norteña*)

A stocky, medium-sized snake with a robust, cylindrical body and a small head that is scarcely wider than its neck. Has a distinctively enlarged rostral scale that gives the tip of the snout a somewhat upturned, pointed appearance, and a very short tail that ends in a sharp nail-like tip. Color pattern usually cream with black longitudinal stripes, but uniformly red or orange morphs occur in some areas. Total length to 29.5 in (75 cm).



Stenorrhina freminvillii ranges from Guerrero and Veracruz, Mexico, south into the Pacific dry forests of northwestern Costa Rica and into the western Central Valley; from near sea level to 7220 ft (2200 m).

Natural history

Stenorrhina freminvillii is a fairly common species that is terrestrial, semi-fossorial, or even fossorial at times. It is most frequently found in seasonally dry habitats such as tropical dry and moist forests. However, it also persists in areas of scrub vegetation, regenerating forest, and shaded plantations. It is diurnal but appears most active at dusk and dawn; note that during the height of the dry season this species appears to switch to a more nocturnal activity pattern.

Individuals can be found under logs, rocks, and other cover objects, but probably readily enter burrows during periods of hot, dry weather and when hunting for large spiders and scorpions. Besides arachnids, *Stenorrhina freminvillii* is known to eat a variety of beetles, katydids, crickets, and insect larvae.

Stenorrhina freminvillii is opisthoglyphous and has a mild venom, which it uses to immobilize its potentially dangerous prey. Scorpions are subdued with coils of the snake's body to prevent them from stinging, even though *Stenorrhina freminvillii* appears to be immune to the venom of local species. Limited observations indicate that scorpions are swallowed tailfirst. This species is harmless to humans; when captured, it usually attempts to hide its head within its body coils and it never attempts to bite.

This species is oviparous; it lays clutches of 5–19 eggs during the dry season (November through April). Eggs have been found in crevices in the soil, as well as in abandoned ant nests. In the northern part of its range, *Stenorrhina freminvillii* produces two clutches in the dry season; it is unclear if this also happens in Costa Rican populations.

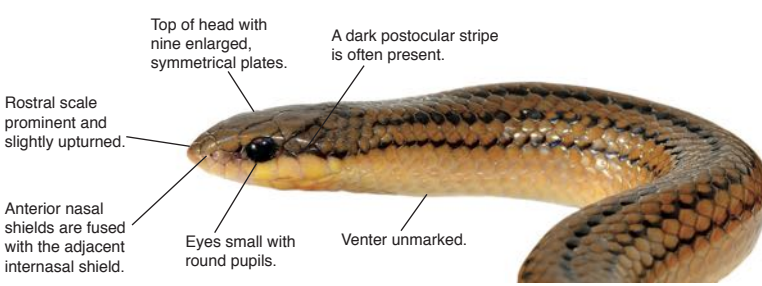
Although most individuals have a characteristic pattern of 1, 3, or 5 black stripes on a light-colored background, some individuals may be uniform reddish-orange. Both color phases can occur in the same area. It is unclear what the selective advantages of either color variety are, and it would make for an interesting study subject. The red color phase somewhat resembles a few other, co-occurring snake species that, as a group, are sometimes referred to in Costa Rica as *vibora de sangre* (blood viper) and erroneously thought to be highly venomous.

Description

Ventral scales number 153–168; 30–50 paired sub-caudals; cloacal scute divided.

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Individuals with a red, pink, or orange-red color, combined with the normal pattern of black longitudinal stripes, occur in the southern part of the distribution range of *Stenorrhina freminvillii*.



Similar species

- *Stenorrhina degenhardtii* (p. 396) never has a striped pattern and solid reddish morphs of that species only occur on the Atlantic slope. It also tends to have a more patterned venter.
- *Ninia sebae* (p. 484) has a red dorsum, but has keeled scales, a black head, and a yellow nuchal collar.
- Juvenile *Clelia* species (pp. 420–423) are also red, with a black head and a light nuchal band.

Tantilla alticola

Least concern

Short-tailed Crowned Snake (*Cabeza Plana Café*)

Small, with a thin, cylindrical body, and a very small head that is not wider than the neck. Dorsal coloration relatively uniform brown, venter orange to red. Has a pale nuchal collar and usually additional light markings on the head, including a prominent pale postocular spot. Loreal scale absent. Total length to 13.8 in (35 cm).

Tantilla alticola occurs along the Atlantic slope of Nicaragua and Costa Rica, and on the Pacific slope from southwestern Costa Rica to western Colombia; from near sea level to at least 5250 ft (1600 m) in Costa Rica, significantly higher still in Colombia.

Natural history

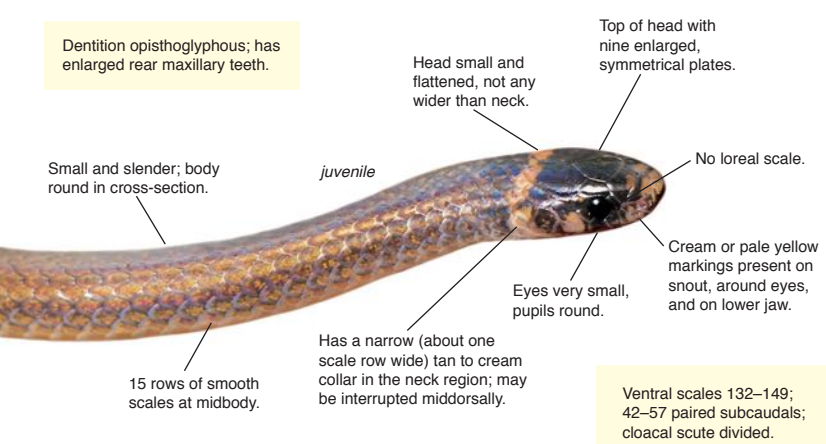
Like most other *Tantilla*, this tiny species is easily overlooked. It is terrestrial and semi-fossorial and is usually seen as it cruises through the leaf litter on the forest floor, or when individuals are uncovered while flipping over logs, rocks, or other cover objects. Mainly diurnal, most sightings of this snake take place in late afternoon; *Tantilla alticola* may switch to a nocturnal activity pattern during periods of hot, dry weather.

Tantilla alticola likely feeds on invertebrates and their larvae, and may prefer centipedes, as has been noted for other *Tantilla* species.

This is an oviparous snake, but no information is available on its reproductive cycle. *Tantilla alticola* is widespread and occurs in a variety of habitats, but never in significant numbers. Its habitats range from pristine wet rainforest in the lowlands, to more open, altered habitats in the mountains; in drier parts of its range, it tends to be more commonly found near streams.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.



Ventral scales 132–149; 42–57 paired subcaudals; cloacal scute divided.

A weakly indicated pale middorsal line, and sometimes a thin pale lateral stripe, may be present.

Dorsal coloration of body and tail brown; head may be darker brown than body.

Tail very short and thick, ends abruptly in a short spine.

Venter orange or red.

Juveniles tend to have more contrasting coloration, with a dark gray head cap and bold pale yellow markings on the head and neck; dorsal coloration light brown or tan. Venter is pale yellow, but gradually changes to orange or red towards the tail.

Similar species

- *Tantilla schistosa* (p. 408) is most similar; it lacks light spots before and behind each eye and has a shorter tail with fewer subcaudal scales.
- Other *Tantilla* species have a different color pattern.
- Several *Trimetopon* species (*gracile*, *pliolepis*, and *similis*) differ in having their prefrontal scales fused into a single plate.
- *Trimetopon slevini* (p. 525) has a pair of circular light spots in the nape.
- *Trimetopon viquezi* (p. 527) has 17 dorsal scale rows and a dark brown dorsum with faint dark longitudinal stripes; it lacks a pale nuchal collar and light spots on the head or neck.

Tantilla armillata

Least concern

Black-necked Crowned Snake (*Cabeza Plana de Cuello Negro*)

Small and slender, with a thin, cylindrical body and narrow head. Black head cap extends well onto neck and is bordered posteriorly by a light collar, which is interrupted by a thin, black middorsal line. Top of head marked with two pairs of cream or yellow dots. Body gray or brown, with a pale lateral stripe. Total length to 17.7 in (45 cm).

Tantilla armillata inhabits dry habitats on the Pacific slope, from Guatemala to northwestern Costa Rica and the Central Valley; it also crosses onto the Atlantic slope in the uplands of Honduras, Nicaragua, and Costa Rica (Central Valley). From near sea level to approximately 4750 ft (1450 m).

Natural history

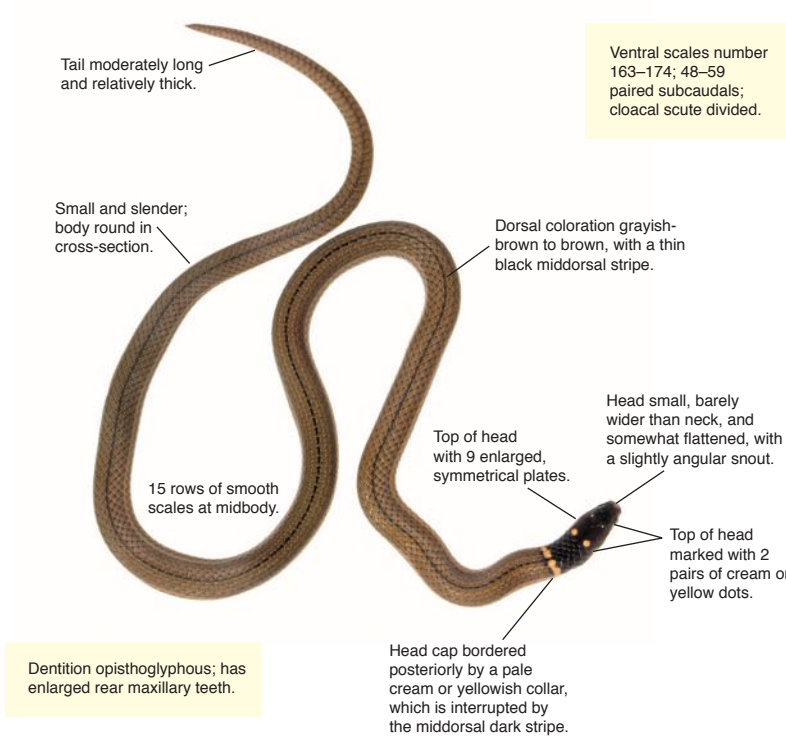
This slender little snake has distinctive head markings that make it one of the more easily identified species of *Tantilla* in the country. It is fairly common in the dry forest habitats of Guanacaste Province; locally, it enters the western Central Valley, where it inhabits open agricultural areas. *Tantilla armillata* is mostly diurnal and crepuscular but may become active at night during dry spells.

It is thought to feed on small invertebrates and their larvae, and probably prefers centipedes.

Tantilla armillata is oviparous, but it is not known when eggs are laid. Given that these snakes inhabit areas with pronounced seasonality, reproduction likely does not take place year-round.

Tantilla armillata and *Tantilla ruficeps* are the only two Costa Rican members of a mostly South American clade of *Tantilla* that is related to *Tantilla melanocephala*. *Tantilla armillata* was previously considered a variety of *Tantilla melanocephala*, and in older literature it is still referred to as such.

Description



Similar species

- *Tantilla ruficeps* (p. 406) does not have paired light spots on top of its head, but has a distinct light lateral stripe on each side of its body that is bordered below by a dark stripe.
- *Trimetopon slevinii* (p. 525) has a single pair of light spots on the nape (not on the enlarged head scales), and has a bright red venter; it has 17 dorsal scale rows.

Tantilla reticulata

Least concern

Striped Crowned Snake (*Cabeza Plana Rayada*)

Small and slender, with a cylindrical body and small head. Unique dorsal pattern consists of several alternating brown and light (with dark borders) stripes. Has a prominent pale-yellow nuchal collar that is interrupted middorsally, and various light markings on the otherwise brown head. Venter pale yellow. Total length to 12.3 in (31 cm).

Tantilla reticulata occurs on the Atlantic slope, from southeastern Nicaragua to northwestern Colombia; it also occurs on the Pacific slope in extreme southwestern Costa Rica. From near sea level to 3935 ft (1200 m).

Natural history

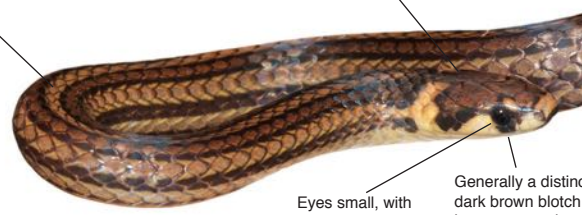
With more than 65 species, the genus *Tantilla* is one of the larger colubrid genera. Nevertheless, very little is known about the habits of any of the species. Most are so small that they are easily overlooked as they crawl through leaf litter on the shadowy forest floor. Like other species in the genus, *Tantilla reticulata* is sometimes spotted when overturning surface debris, logs, or rocks. Interestingly, on several occasions this species has been observed climbing trees. One individual was found actively moving about on an epiphyte-covered branch of an emergent canopy tree (*Vantanea barbouri*) at a height of approximately 100 ft (31 m) above the ground. In undisturbed rainforests, the crowns of epiphyte-laden trees provide a microhabitat with a humus layer and moss cover that is often more extensive than that of the local forest floor. It is not clear, however, how these small snakes detect the presence of a suitable habitat far overhead, or how they are able to climb tall trees with smooth bark.

Most individuals have been encountered in the early morning or late afternoon. It appears that bouts of activity are restricted to a few consecutive days, although observations of this species are too few to suggest a reliable pattern for presumed periods of increased visibility.

Although all species of *Tantilla* have grooved fangs in the back of their mouth and a functional venom gland (Duvernoy's gland), their small size and passive behavior make them harmless to humans. North American species of *Tantilla* quickly immobilize and kill large centipedes with their venom. These centipedes are often highly venomous themselves, and some species even eat small snakes. During the capture of a centipede, the snake often receives bites from its prey, but it appears to be immune to the venom of these dangerous invertebrates. *Tantilla reticulata* is also thought to prey on centipedes and other invertebrates.

Tantilla reticulata lays eggs, but details of its reproduction are still unknown.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 158–173; 59–70 paired subcaudals; cloacal scute divided.

Similar species

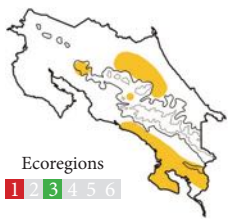
- *Tantilla ruficeps* (p. 406) co-occurs locally but has a black middorsal stripe, not a light-colored one.
- Other species of *Tantilla* have very different color patterns.

Tantilla ruficeps

Least concern

Rufous-headed Crowned Snake (*Cabeza Plana Lineada*)

Small and slender, with a thin, cylindrical body and small, flattened head. Dorsum brown, with a thin dark middorsal stripe and light-colored lateral stripe that is bordered by a dark line below; additional stripes may be present. Head cap pale brown; nuchal collar greatly reduced or absent. Total length to 19.7 in (50 cm).



Tantilla ruficeps is found in scattered localities throughout the humid lowlands and foothills of both slopes of Costa Rica; it also occurs in eastern Nicaragua and western Panama. From near sea level to 5250 ft (1600 m).

Natural history

Another infrequently observed and poorly known species of *Tantilla*. *Tantilla ruficeps* is an uncommon, small, leaf litter snake. It is diurnal, but most individuals are encountered at dawn or near dusk. Although mostly terrestrial, these snakes can also be found hiding below cover objects.

Its diet consists of insect larvae and small invertebrates, but it also preys regularly on centipedes, which are grabbed with a quick strike and held in the snake's mouth until its mild venom immobilizes the potentially dangerous prey. Snakes of the genus *Tantilla* are rear-fanged but completely harmless to humans.

Tantilla ruficeps is oviparous; no details on timing of its reproduction or clutch size currently exist.

Tantilla ruficeps and *Tantilla armillata* are the only two Costa Rican members of a mostly South American clade of *Tantilla* that is related to *Tantilla melanocephala*. *Tantilla ruficeps* was once considered a variety of *Tantilla melanocephala,* and in older literature is still referred to as such.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 142–156; 65–83 paired subcaudals; cloacal scute divided.

Small and relatively slender, round in cross-section.

Dorsal coloration brown, with a distinct, narrow black middorsal stripe.

Generally with one or two light-colored (cream or white) lateral stripes, most prominently indicated on the neck and anterior part of the body, but gradually darkening and becoming more diffuse toward the tail.

Dorsal scales smooth, in 15 rows at midbody.

Tail long and relatively thick.

Ventral surfaces of head, body, and tail uniform white or cream; in some populations, the underside of tail and posterior section of body may be suffused with yellow or red.

Similar species

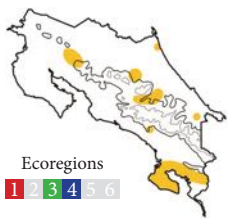
- *Tantilla reticulata* (p. 404) has a beautiful pattern of alternating light and dark stripes; it has a light-colored middorsal stripe.
- *Tantilla armillata* (p. 402) has a distinctive black head cap that extends well onto the neck and is marked with two pairs of light-colored spots.

Tantilla schistosa

Least concern

Collared Crowned Snake (*Cabeza Plana de Collar*)

Tiny, with a thin, cylindrical body, small head, and very short tail. Generally uniform brown or gray, with a wide, uninterrupted cream, tan, or pale-orange nuchal collar. Ventral coloration uniform red or orange-red. Lacks a loreal scale. Total length to 13.8 in (35 cm).



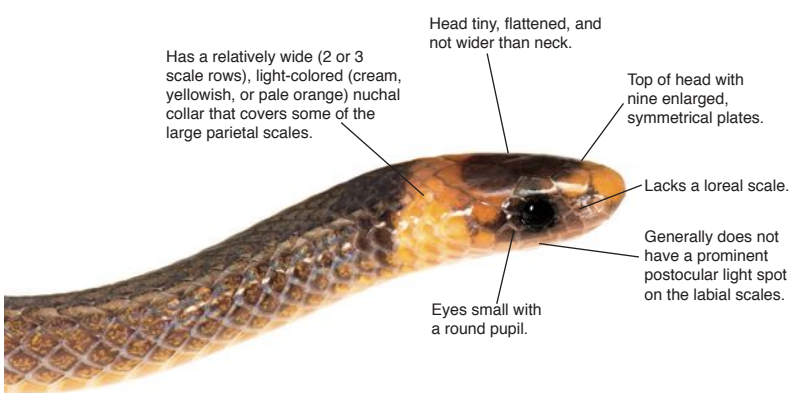
Tantilla schistosa occurs in isolated populations from central Mexico to southeastern Costa Rica on the Atlantic slope, and from central Costa Rica to the Canal Zone in Panama on the Pacific slope. From near sea level to 4595 ft (1400 m).

Natural history

A poorly known, tiny snake of leaf litter and subterranean habitats. Limited observations show that *Tantilla schistosa* may also be partly arboreal. Most individuals are seen at dusk as they crawl across trails, presumably in search of invertebrate prey. This species most likely feeds on insect larvae, small invertebrates, and centipedes. Such potentially dangerous prey (most centipedes are venomous) are generally immobilized through envenomation by the enlarged rear fangs and associated glands. Although these small snakes have a fully functional venom delivery system in place, they are perfectly harmless to humans.

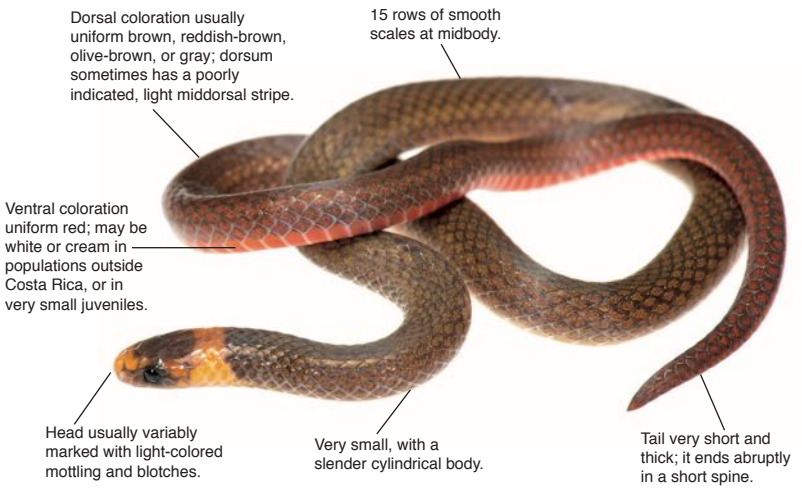
Tantilla schistosa is likely oviparous, but that has yet to be confirmed.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 117–141; 28–36 paired subcaudals; cloacal scute divided.



Tiny leaf litter snakes like *Tantilla schistosa* are easily overlooked and not well studied. This species is likely comprised of multiple cryptic forms throughout its range.

Similar species

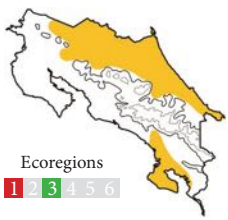
- *Tantilla alticola* (p. 400) is very similar and may be difficult to reliably distinguish in the field; it usually has a red venter and light spots on the head, before and behind each eye. It has a longer tail, with more subcaudal scales.
- Other *Tantilla* species do not have a uniform dark brown coloration and a light nuchal color.
- *Geophis* species (pp. 448–461) are similar in size but have greatly reduced head scales and have a different color pattern.

Tantilla supracincta

Least concern

Coral Crowned Snake (*Cabeza Plana Anillada*)

Small, with a thin, cylindrical body and small head. Coralsnake-like in its pattern; dorsal coloration red, marked with black-bordered light lateral bands that are fused or offset middorsally. Black band across head is bordered by a cream or yellow snout and light nuchal collar; also has a cream or yellow postocular spot on labial scales. Total length to 23.6 in (60 cm).



Tantilla supracincta occurs from eastern Nicaragua to the Canal Zone in Panama, as well as in western Ecuador. It presumably also inhabits Colombia, but no records exist from that country. In Costa Rica, it is found in the Atlantic and southwestern lowlands and foothills and in the Tilaran Mountain Range, from near sea level to 2790 ft (850 m).

Natural history

This species of *Tantilla* has a strikingly different color pattern from the other Costa Rican species in the genus. Where most are cryptic, *Tantilla supracincta* has red, cream, and black bands. The phylogenetic relation between this species and other *Tantilla* awaits clarification. And the evolutionary advantage of having a color pattern that potentially mimics the coloration of venomous coralsnakes remains uncertain. A record of one coralsnake mimic (*Erythrolamprus bizona*) eating an adult *Tantilla supracincta*, another mimic, shows that looking like a coralsnake does not necessarily provide protection from predation by snake-eating snakes. The venomous coralsnakes of the genus *Micrurus* also feed almost exclusively on other snakes; but, given that true coralsnakes readily eat members of their own species, mimicking their coloration offers no protection from being eaten by them.

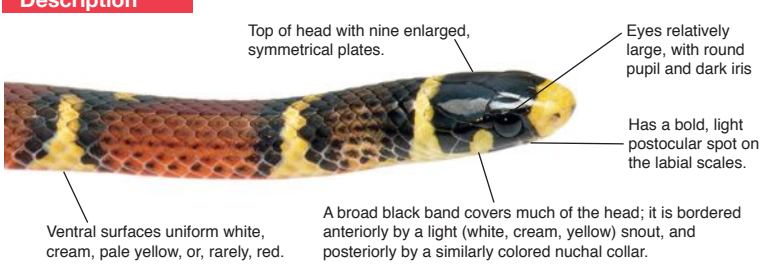
Tantilla supracincta is a rare species in Costa Rica. It is diurnal and usually seen in the middle of the day, although there are records of nocturnal activity too. It is generally seen crawling through the leaf litter during the day. It actively hunts for invertebrate prey and has been reported eating a centipede, confirming dietary preferences seen in other *Tantilla* species. It likely also uses a mild venom to paralyze and subdue its prey. Despite the presence of a venom delivery system, as well as functional venom, these tiny snakes are harmless.

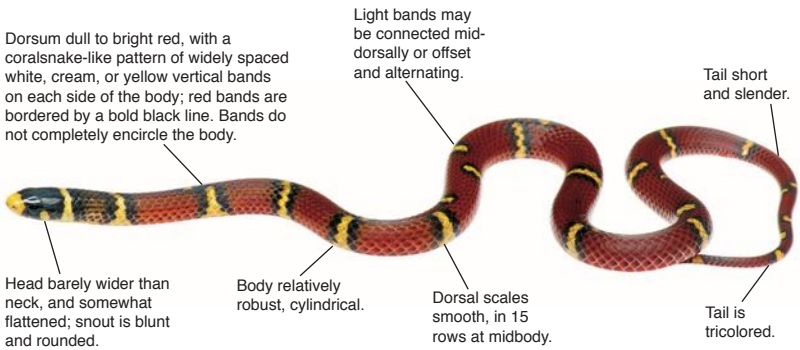
Juvenile individuals do not show their red bands, as those are covered with black pigment (a pattern comparable to that seen in juvenile *Scaphiodontophis annulatus*); juvenile *Tantilla supracincta* therefore appear mostly black and cream, with broad black bands and narrow, light-colored bands. As the snake grows, the black pigment retreats and reveals the underlying red bands.

Tantilla supracincta reproduces oviparously.

In older literature, this species may be listed as *Tantilla annulata*.

Description





Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales 138–151; 52–65 paired subcaudals; cloacal scute divided.

Scalation details of *Tantilla supracincta* are very similar to those in venomous coralsnakes (genus *Micrurus*), but their color patterns are different: the colored bands do not completely encircle the body in *Tantilla supracincta*, and they appear in a different sequence.

Similar species

- *Scaphiodontophis annulatus* (p. 388) has red bands bordered on both sides with yellow bands; it does not have a black iris.
- Young *Lampropeltis* species (pp. 357–360) have a similar tricolored pattern but have more than 15 dorsal scale rows.
- True coralsnakes (*Micrurus* species, pp. 549–561) have colored rings that completely encircle the body; their head and very short tail have a bicolored (black and cream/yellow) pattern only. Red rings are bordered by cream or yellow rings.
- *Erythrolamprus* species (pp. 442–447) are more robust, with a short tail and a less clearly defined color pattern, often with pale centers in the black body rings; they never have the characteristic light postocular spot on the upper lip.

Tantilla vermiformis

Least concern

Worm-like Crowned Snake (*Cabeza Plana de Bosque Seco*)

Tiny, with a small head, thin cylindrical body, and very short tail. Nondescript; brown, gray, or pinkish tan, with a thin dark middorsal stripe. Lacks a nuchal collar but has a pair of indistinct pale blotches on the parietal scales on top of the head, which may be fused. Ventral coloration uniformly pale (cream, pale yellow, or pale pink). Lacks a loreal scale. Total length to 7.9 in (20 cm).

Tantilla vermiformis is restricted to the dry Pacific lowlands of El Salvador, southwestern Honduras, Nicaragua, and northwestern Costa Rica, from near sea level to 1720 ft (525 m).

Natural history

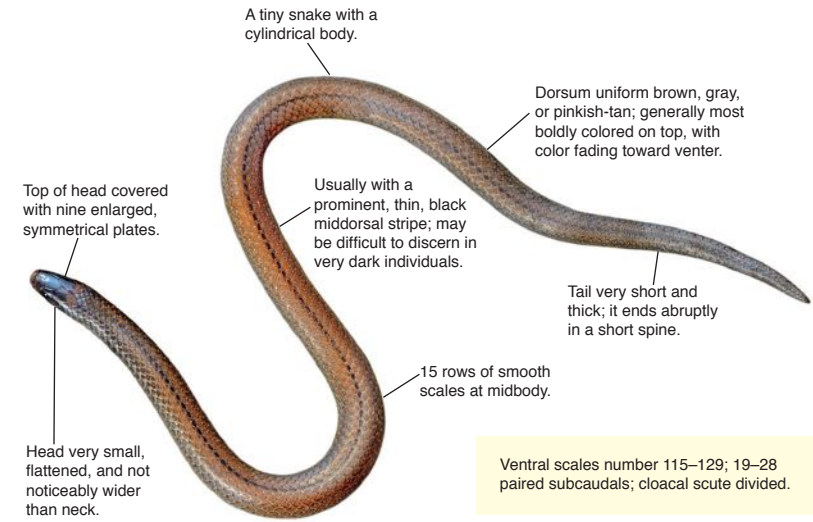
Tantilla vermiformis is a very small, uncommon snake of dry habitats. Limited observations suggest that it is active on, or near, the surface during the rainy season, but that it retreats into insect burrows and rodent tunnels far underground when the soil bakes hard and dry in the drier months of the year. Even during rainy periods, it is most frequently observed below logs, rocks, or other surface debris.

This species is thought to be an insectivore, preferring small insects and their larvae. It has been observed eating termites; no records of *Tantilla vermiformis* eating centipedes yet exit.

Tantilla vermiformis produces clutches of one or two eggs; timing of egg-laying is not known, but likely happens near the onset of the rainy season. Tiny juveniles, measuring about 2.75 in (7 cm), have been observed in August.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.



Similar species

- *Tantilla schistosa* (p. 408) has a light nuchal collar and lacks a middorsal stripe.
- *Tantilla alticola* (p. 400) usually has a pale middorsal stripe and has a red or orange venter.
- *Enulius flavitorques* (p. 440) has a very long tail and a light nuchal collar.

Trimorphodon quadruplex

Central American Lyre Snake (*Toboba Gata*)

Least concern

A medium-sized to large snake with a slightly compressed body. Large eyes have vertically elliptical pupils. Note distinct pattern of alternating dark and light V-shaped or lyre-shaped markings on the top of the head. Characteristically has many small scales (loreal and preocular scales) between the eye and the nostril. Total length to 74.8 in (190 cm).

Trimorphodon quadruplex occurs on the Pacific slope from southern Guatemala to northwestern Costa Rica; it occurs locally on the Atlantic slope of Nicaragua, Honduras, and Guatemala. From near sea level to 4920 ft (1500 m).

Natural history

This large nocturnal snake is commonly seen on low bushes, on the ground, and crossing roads at night. T*rimorphodon quadruplex* is predominantly found in dry areas and is tolerant of habitat alteration. It is regularly seen near human settlements and readily enters homes and other man-made structures in search of prey.

Trimorphodon quadruplex feeds on lizards, small mammals, birds, and bats. Individals are reportedly capable of overpowering and consuming large green iguanas (*Iguana iguana*), up to 4 ft (120 cm) in length and weighing more than the snake itself. Small prey generally succumb to the weak venom, which is administered through the enlarged rear fangs, but larger prey animals are constricted. Like most species, these snakes flee when encountered; if cornered, however, they will defend themselves. Defensive displays include vibrating the tail, flattening and raising the front of the body, and striking repeatedly at the source of the threat. Although large individuals can deliver a painful bite, the venom seems to have no deleterious effect on humans. *Trimorphodon quadruplex* is oviparous and produces clutches of up to 20 eggs, which are generally deposited during the rainy season (September–December). Emergence of hatchlings is timed to coincide with the dry season, when lizard density is highest.

This species often appears as *Trimorphodon biscutatus* in older literature.

Description

young adult

Coloration gray, tan, or brown, with a pattern of 18–24 irregular dark brown to nearly black crossbands across the dorsum; typically with 1–3 light central spots.

23–27 (usually 25) rows of smooth scales at midbody; scales gradually become keeled on posterior half of body and tail.

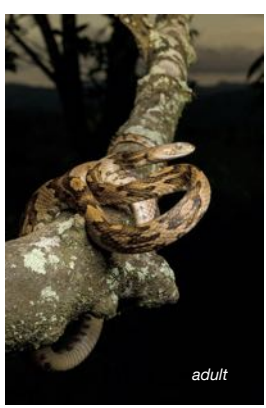
Body slightly compressed.

Head distinctly wider than neck; can appear somewhat viperlike but lacks loreal heat-sensitive pits.

adult

Venter white, cream, or pale yellow, with dark spots and speckling.

Ventral scales number 249–266; 72–102 paired subcaudals; cloacal scute divided.



adult

Displays considerable color and pattern variation throughout its distribution range. Even on a given individual, patterns change with age; juvenile pattern tends to be more pronounced than that of large adults.

Similar species

- *Leptodeira rhombifera* (p. 472) is considerably smaller and does not have a compressed body.
- *Xenodon rabdocephalus* (p. 540) has round pupils.
- Juvenile *Senticolis triaspis* (p. 392) have round pupils.
- *Bothrops asper* (p. 587) has prominent loreal pits between its eyes and nostrils.

Family Dipsadidae
(Dipsadid Snakes)

This large family of rear-fanged snakes is restricted to the Americas and the West Indies. Its nearly 800 species are very diverse in terms of morphology and biology. They cannot be distinguished easily from members of the family Colubridae using external morphology alone. There are 63 species of dipsadid snake in Costa Rica; all have heterogeneous dentition, meaning that the teeth are not equal in size. In the majority of the species, most of the teeth are small, but the rear teeth on the upper jaw (maxillary bone) can reach fanglike proportions (ophistoglyphous dentition). Note, however, that in some species the teeth are quite similar in size and would be better classified as aglyphous. Regardless of their size, all teeth are solid—and none of the dipsadid snakes have hollow fangs specifically evolved to inject venom. Nevertheless, many species in this family produce a mild venom and are capable of envenomating their prey; sometimes they use their grooved rear fangs to introduce a little venom with each bite. Ophistoglyphous snakes can be seen “chewing” on their prey, repeatedly piercing the skin with the enlarged rear fangs to introduce more venom. No Costa Rican dipsadid snakes are known to pose a serious threat to humans and their bites generally result only in mild, localized effects.

Although there is no single, easily observed diagnostic feature for this family, there are certainly a few recognizable body types. The most striking perhaps are the "goo-eaters," or "snail-eaters." These small snakes have an exceedingly slender body, combined with a very broad head, blunt snout, and large eyes. They feed on soft-bodied prey such as frog eggs, slugs, worms, and snails. Some species have specially adapted jaw mechanisms that enable them to extract snails from their shells; other larger species feed on arboreal frogs or sleeping lizards. The "goo-eaters" include members of the genera *Dipsas*, *Imantodes*, *Sibon*, *Tropidodipsas*, and, to some extent, *Leptodeira*.

Another group is composed of small fossorial snakes and other small leaf-litter inhabitants. The fossorial species of the genera *Geophis* and *Trimetopon* have reduced head scales, tiny eyes, and a bullet-shaped head for digging. *Ninia* species, which are usually found hiding under cover objects and likely don't tunnel much, have a blunt snout and rough, heavily keeled scales.

Many of the small leaf-litter snakes in this family have a long, delicate tail that breaks easily, thus helping the snake escape predators. Such snakes can be found in the genera *Coniophanes*, *Enuliophis*, *Enulius*, *Nothopsis*, *Pliocercus*, *Rhadinaea*, *Rhadinella*, and *Urotheca*.

The remaining members of the the family Dipsadidae in Costa Rica defy easy characterization. These include a lightning-fast lizard hunter (*Conophis lineatus*), two semi-aquatic species (*Hydromorphus concolor* and *Tretanorhinus nigroluteus*), coralsnake mimics (e.g., *Erythrolamprus mimus*), a fer-de-lance mimic (*Xenodon rabdocephalus*), two large snake-eating snakes (genus *Clelia*), and other fascinating species.

Amastridium veliferum

Least concern

Ridge-headed Snake (*Cabeza de Herrumbre*)

A small, slender terrestrial snake with a long tail. Has a distinctive "frown," created by a sharp-edged ridge between the eyes and the tip of the snout. Color pattern distinctive. Head is rust-brown; body (gray, olive, or black) is marked with five black lines and a linear series of tiny light spots on each side. Total length to 28.3 in (72 cm).

Amastridium veliferum occurs on the Atlantic slope of extreme southeastern Nicaragua, Costa Rica, and adjacent Panama. An isolated population occurs on the Osa Peninsula and in the Golfo Dulce area of southwestern Costa Rica. From near sea level to 3935 ft (1200 m).

Natural history

There are two species in this Central American genus: *Amastridium veliferum* inhabits the southern part of the isthmus, whereas the nearly identical *Amastridium sapperi* occurs in disjunct populations in Guatemala, Honduras, and Mexico. *Amastridium veliferum* is an infrequently seen species of pristine forests. It is terrestrial and possibly fossorial, and most often encountered in the leaf litter layer during the day.

Prey items reported for this species include small leaf litter frogs (e.g., various *Craugastor* species) and small lizards. A recent record for the related *Amastridium sapperi* reports it feeding on yellow-spotted tropical night lizards (*Lepidophyma flavomaculatum*); whether Costa Rican *Amastridium veliferum* also feed on those lizards remains unknown. One individual was observed examining a temporary puddle filled with tadpoles, suggesting that its diet may include larval amphibians.

Amastridium veliferum is oviparous; as yet there is no additional information on its reproductive behavior.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

17 rows of smooth scales at midbody.

A dorsolateral series of tiny cream or white dots, spaced every 4 or 5 scales, marks each side of the body.

Dorsal coloration dark brown, dark slate-gray, to almost black, with 5 thin black longitudinal stripes.

Ventral scales 111–134; 69–86 paired subcaudals; cloacal scute divided.

Similar species

- *Urotheca fulviceps* (p. 533) has a similar color pattern (uniformly dark body and distinctly brown head), but it lacks the pronounced canthal ridge.

Clelia clelia

Least concern

Common Mussurana (*Zopilota Común*)

Large and powerful, with a robust, cylindrical body. The head is relatively small, with small eyes and vertically elliptical pupils. Dorsal scales shiny and smooth, in 19 rows at midbody. Adults uniform gray to nearly black, with a white or cream venter; juveniles with red body and tail, black head and neck, and a yellow nuchal band. Total length to 97.2 in (247 cm) in females, males to 70.9 in (180 cm).

Clelia clelia has a very large distribution range, from northern Guatemala and central Belize south to Ecuador, Uruguay, and Argentina; from near sea level to 2950 ft (900 m).

Natural history

This is a relatively common species of lowland and middle elevation dry, humid, and wet forests; it also frequents disturbed habitat types and can sometimes be found near homes and farms. *Clelia clelia* is a terrestrial species and has been found active both during the day and at night. When it is observed during the day, it is usually found in relatively shaded areas such as stream beds in forest habitats; it is also often seen on overcast days, just before or after rain storms.

Clelia Clelia is famous for eating other snakes, including some of the most feared pitvipers in the region, such as the fer-de-lance (*Bothrops asper*). It uses venom and constriction to overpower its prey. With a lightning strike, it grabs another snake behind the head, immediately wrapping its entire body around the victim. Prey is killed by constriction; but the venom, which is administered through grooved fangs in the back of the mouth, is used to paralyze it. *Clelia clelia* is immune to the venom of co-occurring pitvipers, but apparently not to the venom of coralsnakes. It immobilizes its prey with several coils of its body, and this also helps it to avoid physical damage to organs from a viper's long fangs. Although snakes make up the bulk of its diet, this species will readily eat large lizards (e.g., *Holcosus* and *Basiliscus* species [the latter reportedly taken as they sleep on branches at night]) and small mammals as well.

These large, muscular snakes are quite docile when handled and do not attempt to bite. Since the effects of their venom on humans remain largely unknown, however, individuals should be treated with care. In addition, large individuals are powerful constrictors; their strong grip may surprise anyone who carelessly handles one. Juvenile *Clelia clelia* have a strikingly different color pattern than do adults, and are locally known as *vibora de sangre* (blood viper); they are erroneously thought to be highly venomous.

Clelia clelia is oviparous. In captivity, females have produced clutches of up to 25 eggs; a Costa Rican individual produced a clutch of 10 large eggs in the wild. Eggs have been reported throughout the early part of the rainy season (April through October), and incubation lasts about four months. Mating is preceded by courtship; in captivity, females have been known on occassion to kill and eat males that initiate courtship.

These snakes, locally known as *zopilota* or *mussurana*, are among the few snake species that people allow to live near their homes because of their snake-eating habits. The Instituto Butantan in São Paulo, Brazil, one of the most important producers of snake antivenom, installed a statue of a *Clelia clelia* outside its facility to honor its role in helping to reduce snake bite incidents.

Currently, two or three species of *Clelia* are thought to occur in Costa Rica; more information is needed to resolve this situation. *Clelia clelia* tends to be found in lowland settings, whereas *Clelia scytalina* occupies higher elevation sites. It is possible that a third, more southern species, *Clelia equatoriana*, also reaches the southern parts of the country, but all three species are very similar-looking and easily misidentified. Until more details are available, the author prefers to conservatively treat the Costa Rican *Clelia* as two different forms.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 198–248; 65–93 paired subcaudals; cloacal scute undivided.

Similar species

- *Clelia scytalina* (p. 422) appears nearly identical but has 17 dorsal scale rows at midbody; it is generally found at higher elevations than *Clelia clelia*.
- Adults resemble *Chironius grandisquamis* (p. 335), which has a pronounced keeled ridge along its spine and only 10 dorsal scale rows.
- Adults resemble very dark *Lampropeltis micropholis* (p. 359), which differs in not having a white venter.
- *Ninia sebae* (p. 484) resembles juvenile *Clelia clelia*, but the red dorsal coloration in the former species directly borders a yellow nuchal band, while in *Clelia clelia* the red dorsal coloration is separated from the yellow collar by a black blotch.

Clelia scytalina

Data deficient

Highland Mussurana (*Zopilota de A ltura*)

Large and powerful, with a robust, cylindrical body; head relatively small, with small eyes and vertically elliptical pupils. Dorsal scales shiny and smooth, in 17 rows at midbody. Adults uniform gray to nearly black, with a white or cream venter; juveniles with red body and tail, black head and neck, and a yellow nuchal band. Total length to 70.9 in (180 cm) in females, males to 59.1 in (150 cm).

Clelia scytalina has a disjunct distribution throughout the foothills of various mountain ranges between southern Mexico and Colombia. From 1310–3935 ft (400–1200 m).

Natural history

Clelia scytalina is nearly identical to the more widespread species *Clelia clelia* in biology, morphology, and coloration, and both species undergo a similar ontogenetic color change as they get older. *Clelia scytalina* is generally found at higher elevations than *Clelia clelia*.

This species also largely feeds on other snakes, which are killed through a combination of constriction and venom that is delivered through the enlarged and grooved rear fangs. It is immune to the venom of co-occurring pitvipers but tends to immobilize these dangerous animals using several coils of its body to avoid physical damage from their long fangs. It is likely that other prey such as lizards and small mammals are on the menu as well.

Clelia scytalina is oviparous, but no data exists on clutch size or timing of oviposition. Because of its similarity to the more common *Clelia clelia*, both are easily confused and observations pertinent to *Clelia scytalina* may be erroneously ascribed to its close relative. *Clelia scytalina* is quite rare throughout its range in Central America, and it is poorly represented in collections. It is possible that this species is restricted to Mexico, Belize, and Guatemala, and that individuals from Costa Rica and Panama that have been assigned to *Clelia scytalina* in fact represent a different form, *Clelia equatoriana.* As currently understood, *Clelia equatoriana* occurs in northern South America and only marginally enters extreme eastern Panama, but the taxonomic relationship of this and the nearly identical *Clelia scytalina* is poorly understood. Both species have 17 dorsal scale rows but *Clelia equatoriana* can be distinguished from *Clelia scytalina* mainly by the absence of apical scale pits; all other scalation characteristics broadly overlap. Future studies may show that *Clelia equatoriana* is more widespread in lower Central America, including Costa Rica, in which case animals now considered to be *Clelia scytalina* may in fact be *Clelia equatoriana* instead.

Description

Very muscular, with a moderately robust body and a medium-length tail.

Body is cylindrical and covered with 17 rows of smooth, shiny dorsal scales.

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Head short and only slightly wider than the neck. Top of head with nine enlarged, symmetrical plates.

Ventral scales 202–228; 75–92 paired subcaudals; cloacal scute undivided.

Adults uniform blue-black to dark gray, with a dirty-white or cream venter and throat.

The supralabials are always somewhat lighter in color than the rest of the body.

Subadults may be all gray or black, but still show a pale band across the neck; it gradually disappears with age.

Juveniles have a striking bright red dorsal pattern, a black head, and a distinct broad yellow band across the nape that is bordered posteriorly by a black blotch.

The red dorsal scales are tipped with black and darken with age.

Juveniles have a uniform white venter.

Eyes small, with a vertically elliptical pupil and dark reddish-brown iris.

Similar species

- *Clelia clelia* (p. 420) appears nearly identical but has 19 dorsal scale rows at midbody; it is generally found at lower elevations than *Clelia scytalina*.
- Adults resemble *Chironius grandisquamis* (p. 335), which differs in having a pronounced keeled ridge along its spine and only 10 dorsal scale rows.
- Adults resemble very dark *Lampropeltis micropholis* (p. 359), which differs in not having a white venter.
- *Ninia sebae* (p. 484) resembles juvenile *Clelia scytalina*, but the red dorsal coloration in the former species directly borders a yellow nuchal band anteriorly, while in *Clelia scytalina* the red dorsal coloration is separated from the yellow collar by a black blotch.

Coniophanes bipunctatus

Data deficient

Mottled-lipped Spotbelly (*Ranera de Labios Moteados*)

A brown, small to medium-sized snake. Marked with fairly distinct dorsolateral and middorsal dark lines; usually has a dorsolateral linear series of white dots or dashes and one or a few white marks in the neck area. Lower half of head white or cream, marked with a series of narrow black lines and dark spots. Each ventral scale uniformly pale, with a pair of bold, black dots. Total length to 27.6 in (70 cm).

Coniophanes bipunctatus is found in disjunct populations along the Atlantic slope, from southern Veracruz, Mexico, to Escudo de Veraguas Island in northwestern Panama; from near sea level to 1310 ft (400 m). In Costa Rica it is only known from the Barra del Colorado Wildlife Refuge near the border with Nicaragua.

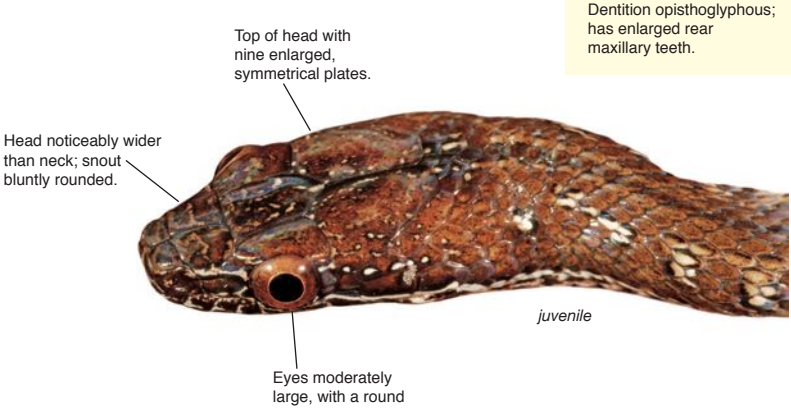
Natural history

This rare snake was only relatively recently (2001) added to the snake fauna of Costa Rica. Terrestrial to semi-aquatic, *Coniphanes bipunctatus* is only known from a few scattered forested swamp habitats in the Atlantic lowlands. It hunts for frogs and fish, particularly synbranchid swamp eels, but may also feed on small leaf litter lizards, all of which are hunted after dark. Prey is captured with a quick strike and killed with a mild venom that is administered through the enlarged fangs in the back of the mouth.

Coniophanes bipunctatus is more widespread and common in northern Central America; only a few individuals have been recorded in Costa Rica and adjacent western Panama. Little is therefore known of its habits and biology in the country. Elsewhere, this oviparous snake produces clutches of up to six eggs.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.



21 rows of smooth scales at midbody.

Dorsum reddish-brown or orange-brown, marked with a robust middorsal dark line that bisects the brown dorsal band.

A medium-sized snake with a relatively robust, cylindrical body and a medium-length tail.

adult

Narrower black lines separate the brownish-orange ground color from the lateral darker brown bands.

A thin black postocular line separates brown dorsum from mottled white lip shields; extends well on to the body.

Lip shields and chin white, marked with dense, dark grayish-brown mottling.

Ventral scales 124–145; 72–101 paired subcaudals; cloacal scute divided.

Chin area heavily suffused with dark mottling and a series of thin dark lines.

Ventral scutes each marked with a pair of bold, black circular spots that line up to form two linear series of spots. Ventral surfaces cream to pale orange; white on throat.

Juvenile has more irregularly edged bands than does the adult and its coloration changes dramatically over time. But, the middorsal dark line that bisects the dorsal brown band is visible at any age.

Similar species

- *Coniophanes fissidens* (p. 426) has a pattern of small black specks on its ventral scales, not a pair of discrete black spots on each scale; its dorsum is marked with a pair of narrow, light-edged dark dorsolateral lines.
- *Rhadinaea decorata* (p. 494) generally has an unpatterned, bright orange venter; its dorsum is marked with a pair of light dorsolateral stripes on the anterior portion of the body, a pair of ocelli in the neck, and dark-bordered light postocular stripes.
- *Urotheca guentheri* (p. 535) has two pairs of dark-bordered white stripes and two pairs of dark-bordered ocelli on the back of the head and neck; venter is immaculately orange.

Coniophanes fissidens

Brown Spotbelly (*Ranera Café*)

Least concern

Small to medium-sized. Brown with indistinct dorsolateral and/or middorsal dark lines; usually with a dorsolateral linear series of white dots or dashes and one or several white marks in the neck area. Lower half of head white or cream, with a pattern of dark spots. Centers of each labial scale, and the edges of each ventral scale, marked with a discrete dark spot. Total length to 21.7 in (55 cm).

Coniophanes fissidens ranges widely along both slopes of Central America, from Veracruz and Oaxaca, Mexico, to Panama (it is absent from the arid lowlands of Pacific Nicaragua and northwestern Costa Rica). It also occurs in Colombia and Ecuador. From near sea level to 3770 ft (1150 m).

Natural history

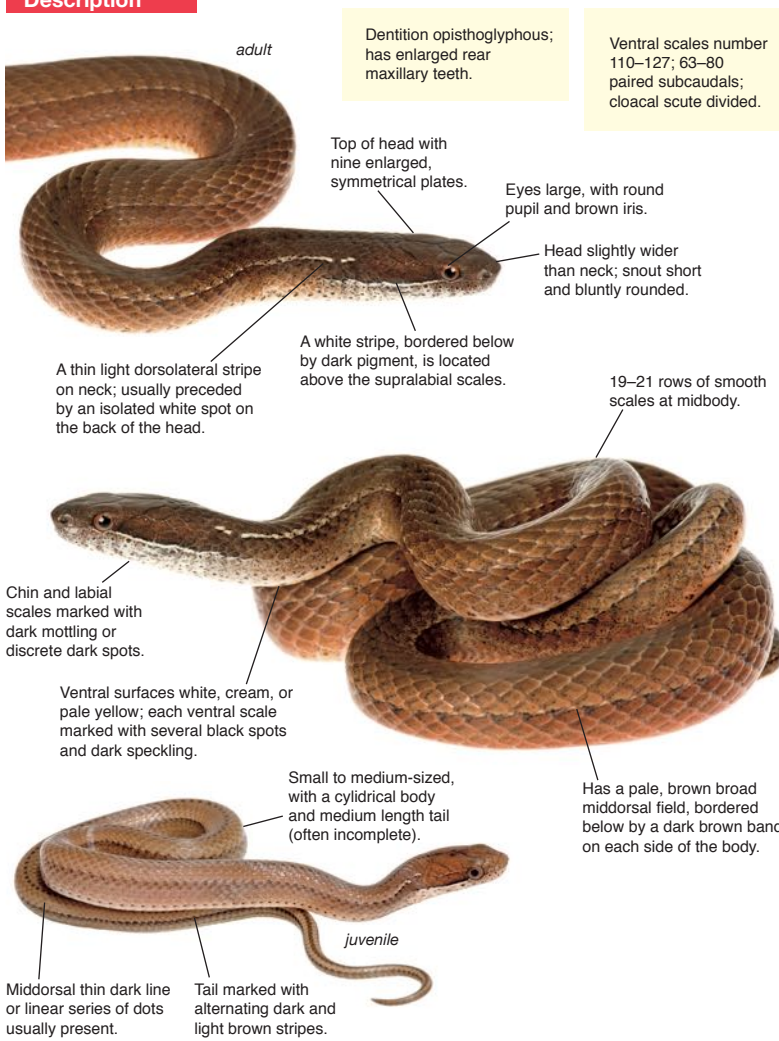
A common, widespread terrestrial snake of forest interiors. *Coniophanes fissidens* is a diurnal leaf litter species that actively hunts for leaf litter frogs and toads, as well as small lizards. Frog eggs, lizard eggs, and small snakes have also been documented as prey items, and small juveniles may also feed on invertebrates. Remarkably, an individual of this species reportedly ate a toxic strawberry poison-dart frog (*Oophaga pumilio*), a frog with few vertebrate predators. All prey is subdued and killed using venom that is administered through enlarged rear fangs. *Coniophanes fissidens* generally does not try to bite when captured, but individuals restrained by the neck may attempt to slice into a finger with the rear fangs protruding out of the side of the closed mouth. Its venom may cause bleeding, swelling, and pain near the bite site.

In most cases, *Coniophanes fissidens* relies on its cryptic coloration to avoid predation. It readily escapes into or below the leaf litter layer. When seen through a gap in the leaf litter, its striped pattern makes it difficult for a predator to see, whether it is stationary or moving; if it is moving when dectected, the striped pattern makes it hard to discern the direction of movement. When restrained by its tail, this snake is capable of breaking off a section of the tail. A significant number of these snakes have an incomplete tail, evidence of the effectiveness of this antipredator strategy.

Coniophanes fissidens is oviparous. It reportedly produces clutches of up to eight eggs during the rainy season (March through August), which ensures that plenty of small frogs are available for the hatchling snakes to prey on. Its breeding season is likely more protracted in wetter habitats.

There is considerable regional variation in the color pattern of these snakes and there is also ontogenetic variation. Younger individuals tend to have far less stippling on the ventral scales and on the light labial scales than do older adults. Because of the extensive variation in coloration and its relatively nondescript appearance, *Coniophanes fissidens* can be a challenge to identify.

Description



Similar species

- *Coniophanes bipunctatus* (p. 424) has a pair of large, discrete black spots on each ventral scale and a different dorsal pattern.
- *Rhadinaea decorata* (p. 494) generally has an unpatterned bright orange venter; its dorsum is marked with a pair of light dorsolateral stripes on the anterior portion of the body, a pair of ocelli in the neck, and dark-bordered light postocular stripes.
- *Urotheca guentheri* (p. 535) has two pairs of dark-bordered white stripes and two pairs of dark-bordered ocelli on the back of the head and neck; venter is immaculately orange.

Coniophanes piceivittis

Striped Spotbelly (*Ranera Rayada*)

Least concern

Small to medium-sized, with a diagnostic color pattern of cream or pale yellow on the venter and lower half of the body and tail; dorsum is glossy black, with a pair of light-colored dorsolateral stripes that run from the snout to the tail tip. Total length to 22.4 in (57 cm).

Coniophanes piceivittis occurs on the Pacific slope, from Mexico to northwestern Costa Rica and parts of the Central Valley; it also occurs on the Atlantic slope of northern Mexico. From near sea level to 4265 ft (1300 m).

Natural history

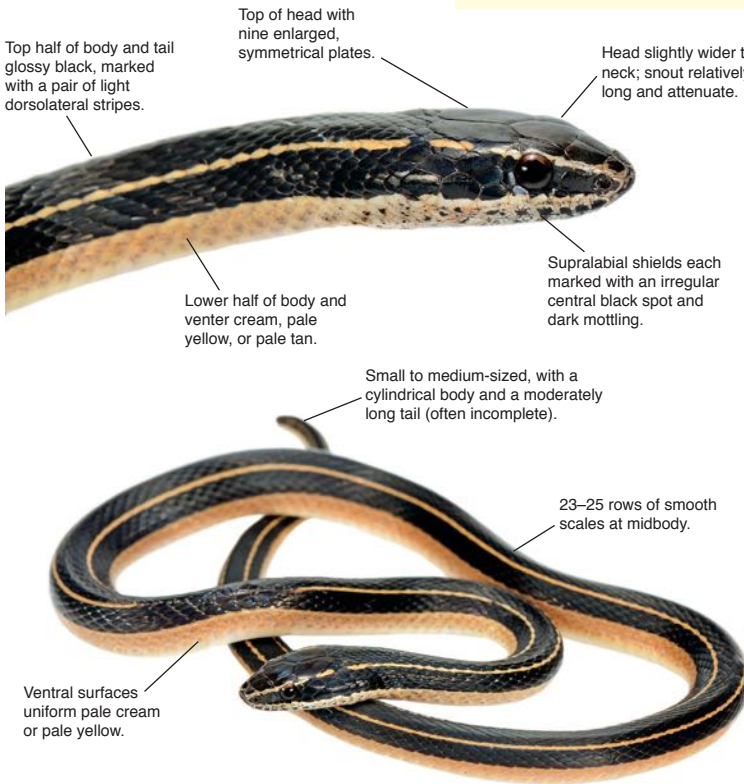
This agile terrestrial snake reaches the southern edge of its distribution range in the dry forests of northwestern Costa Rica. *Coniophanes piceivittis* is active at dawn and dusk, as well as at night, when it hunts for terrestrial frogs and small lizards. Prey is killed with a mild venom that may cause localized pain, swelling, and itching in humans. These fast-moving snakes are quick to bite when captured and when restrained by the neck will even attempt to slice into a finger with the enlarged rear fangs protruding out of the side of the closed mouth.

This appears to be an uncommon snake, but its surface activity (and therefore its visibility) may be reduced by the pronounced seasonality that prevails in the Costa Rican Pacific northwest. Amphibian prey becomes scarce during the dry season, and *Coniophanes piceivittis* seems to retreat into humid microhabitats near streams and other bodies of water during this period. Individuals are sometimes found hiding underneath rocks and logs.

Coniophanes piceivittis is oviparous and capable of producing clutches of up to six eggs. Hatchlings have been reported during the rainy season, in September and October; this period coincides with amphibian breeding and ample availability of small prey for young snakes.

Description

Ventral scales number 153–174; 78–115 paired subcaudals; cloacal scute divided.



Similar species

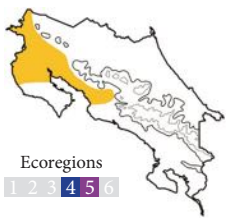
- *Conophis lineatus* (p. 430) has a pattern of 6–11 dark dorsal and lateral stripes on a tan background.
- *Crisantophis nevermani* (p. 432) has a dark dorsum with 2–4 light stripes; sutures and edges of each labial scale are marked with black pigment.

Conophis lineatus

Roadguarder (*Guardacamino Común*)

Least concern

A fast-moving diurnal snake with a cone-shaped head that is scarcely wider than the neck. Cream to tan, with a bold pattern of dark longitudinal stripes on the body and tail. Sides of head and body marked with a dark lateral band, bordered above and below by light-colored stripes that converge on the tip of the snout. Total length to 51.6 in (131 cm), but generally much smaller.



Conophis lineatus is found in dry lowlands and foothills. On the Atlantic slope, it occurs from Mexico southward to northeastern Honduras; on the Pacific slope, it occurs from Guatemala to northwestern Costa Rica. From near sea level to 3610 ft (1100 m).

Natural history

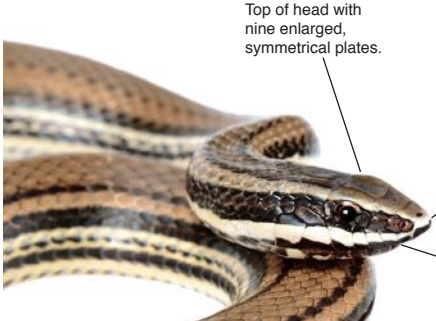
Conophis lineatus is a fast-moving diurnal snake. It prefers dry or semi-dry open habitats with low vegetation; it is often found in vegetation along roadsides (hence its common name). These snakes are often still active during the middle of the day, when high temperatures cause most reptiles to go into hiding. When pursued, they usually disappear rapidly into areas of dense vegetation or underground into a burrow.

This is an alert and active hunter that preys on lizards, particularly the whip-tailed lizards of the genera *Holcosus* and *Aspidoscelis*; prey is pursued with impressive speed. Frogs, toads, snakes, small mammals, birds, and even bird eggs have also been reported as prey items. The snake usually coils around the prey several times and then bites, injecting a potent venom with its very large rear fangs. Prey tend to succumb quickly to the effects of the venom.

Conophis lineatus is one of the more dangerous of the "non-venomous" snakes in Costa Rica and its bite can cause pain, local swelling, headaches, vomiting, and a general feeling of discomfort. The venom seems to contain anti-coagulating components, because bite wounds often bleed profusely for some time; the effects of a bite can persist for more than a day and bites should be considered potentially significant.

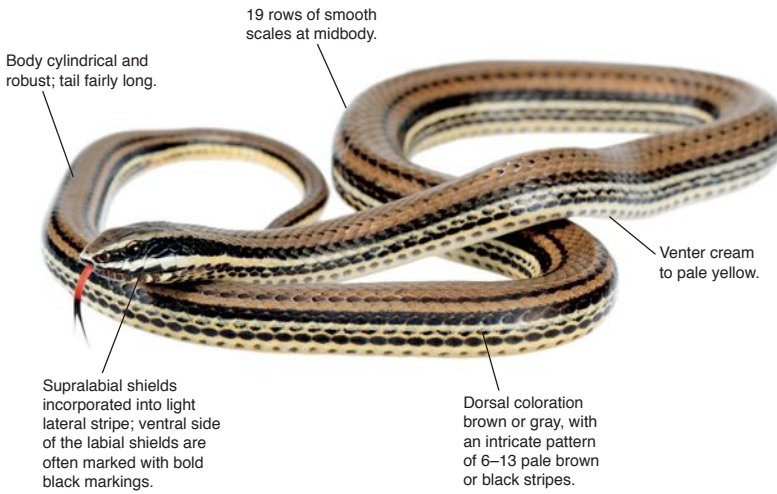
This species is oviparous and produces clutches of up to 12 eggs. Eggs have been found during the early dry season, from January through April; they take approximately 3 months to incubate.

Description



Occasionally individuals display a nearly uniform dark coloration.

Ventral scales number 159–178; 60–80 paired subcaudals; cloacal scute divided.



Similar species

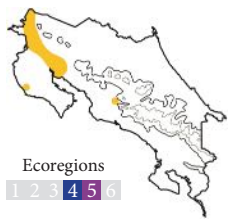
- *Crisantophis nevermani* (p. 432) is similar in overall appearance but is darker and has fewer stripes on its body. Each supralabial scale is white or cream with a dark upper border.
- *Coniophanes piceivittis* (p. 428) has a yellowish-cream venter and a glossy black dorsum that is marked with a pair of light-colored dorsolateral stripes that run from the snout to the tail tip.

Crisantophis nevermanni

Least concern

Gray-backed Roadguarder (*Guardacamino Oscura*)

A medium-sized, fast-moving snake. Has a robust cylindrical body and an attenuate head that is scarcely wider than the neck. Dorsum dark brown to near black, with 2–4 thin light lines; has a light-colored venter. Each supralabial scale white or cream with a dark border. Total length to 39.4 in (100 cm).



Crisantophis nevermanni occurs throughout the dry Pacific lowlands of western Guatemala, western Honduras, El Salvador, Nicaragua, and northwestern Costa Rica. From near sea level to about 1315 ft (400 m). It is possible that this species also occurs at higher elevations in Costa Rica's Central Valley.

Natural history

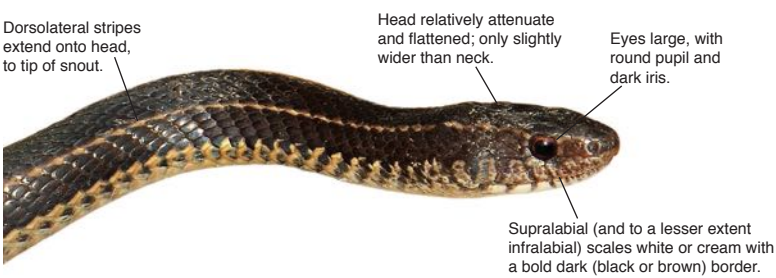
This fast-moving, diurnal snake is very similar in behavior, habitat preference, and biology to *Conophis lineatus*. It is also primarily found in open, dry, sun-exposed habitats in northwestern Costa Rica. It is tolerant of habitat alteration and is regularly seen in cultivated areas such as farm fields, plantations, and roadsides. *Crisantophis nevermanni* feeds mostly on amphibians, although it is known to also eat reptiles, including snakes, and possibly small mammals. Because of its preference for frogs, it is more often found near bodies of water than is *Conophis lineatus*, which prefers reptiles.

Crisantophis nevermanni has greatly enlarged rear fangs that may help it when ingesting prey. Many frogs and toads inflate their body when facing a predator to make themselves look bigger and more intimidating, but to also make it harder for smaller predators to swallow them. Other amphibian specialists, such as *Xenodon rabdocephalus*, use their enlarged rear fangs to puncture the frog's skin and deflate their prey before swallowing. It is possible that this species does the same. *Crisantophis nevermanni* also injects a mild venom that can cause localized pain and swelling in humans.

This species is oviparous and has been reported to produce clutches of up to 10 eggs. One record of a female laying 3 eggs mentions that she had retained another 7 eggs, which could indicate that eggs are deposited in more than one location.

Intriguingly, the holotype of this species is supposedly from near San José, at an elevation of 4545 ft (1385 m), while all other known individuals occur at much lower elevations. Either the holotype is mislabeled or this record may indicate that *Crisantophis nevermanni* was once more widespread than it is today.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Dorsum black, dark gray, dark brown, or dark olive, marked with 2–4 white, cream, or pale-gray stripes.

A moderately slender snake with a cylindrical body and long tail.

Top of head with nine enlarged, symmetrical plates.

Ventral surfaces cream or pale dirty yellow.

19 rows of smooth scales at midbody.

Ventral scales number 173–183; 71–89 paired subcaudals; cloacal scute divided.

Dark markings on lower dorsal scale rows create a series of vertical bars or blotches on the cream or dirty white lower half of the body.

Dark coloration on head mottled.

Similar species

- *Conophis lineatus* (p. 430) lacks the dark dorsal coloration and the black markings along the sutures of the supralabial scales; it has a cone-shaped head and a pointed snout.
- *Coniophanes piceivittis* (p. 428) has a dark central spot on each supralabial scale, but the edges along the sutures are white; it has a uniformly light-colored venter and only three broad, dark dorsal stripes.

Dipsas articulata

Least concern

Red-striped Thirst Snake (*Caracolera Rosada*)

A skinny snake with a distinctly compressed body, a bluntly-rounded head, and very large eyes with vertically elliptical pupils. Color pattern consists of alternating broad black and white rings that completely encircle the body and tail; usually with some red or orange middorsal markings in the white rings. Total length to 29.5 in (75 cm).

Dipsas articulata inhabits the Atlantic lowlands, from southeastern Nicaragua to central Panama; on the Pacific slope, it may occur locally in northwestern Costa Rica. From near sea level to 3610 ft (1100 m).

Natural history

A small, slender nocturnal snake with striking black and white bands. *Dipsas articulata* is highly adapted to an arboreal life; it has an I-beam shaped body that gives it the strength to extend its body long distances from branch to branch, and a prehensile tail. As adept as they are as climbers, these snakes are sometimes also found on the ground. Snakes in the genus *Dipsas* are members of a group of specialized "goo-eating" or snail-eating snakes; in Costa Rica, this group also includes members of the genera *Sibon* and *Tropidodipsas*, snakes that have special modifications to their dentition, skull morphology, and musculature to allow them to extract snails from their shells and eat such soft-bodied prey. *Dipsas articulata* is the most highly adapted of these forms; it specializes so much on eating snails that it has lost the mental groove on its chin, which in all other Costa Rican snakes facilitates a sideways expansion of the lower jaw to accommodate the ingestion of larger, bulky prey.

Dipsas articulata inhabits humid forests, mostly in relatively pristine areas and invariably in the vicinity of marshes, ponds, or streams; these areas maintain the high level of humidity required by its preferred prey, snails and slugs. Because of this reliance on relatively high humidity, *Dipsas articulata* is much more commonly observed during the rainy season; it is rarely seen during dry spells, and may retreat into the canopy at such times. A few records of this species from the relatively dry northwestern part of the country seem somewhat out of range. However, these sightings are reportedly from areas of gallery forest, alongside streams, and it possible that *Dipsas articulata* is more widespread in that region in humid microclimates.

This species is invariably encountered at night, when it hunts for food low on tree trunks or bushes. Slugs are simply swallowed whole, while snails are grabbed by the shell and manipulated so the snake can insert its lower jaw deep into the shell's opening. Long, recurved teeth in the lower jaw allow the snake to better hold on to slippery prey, but also "hook" the soft body of the snail and extract it from its shell. Once removed, the soft body of the snail

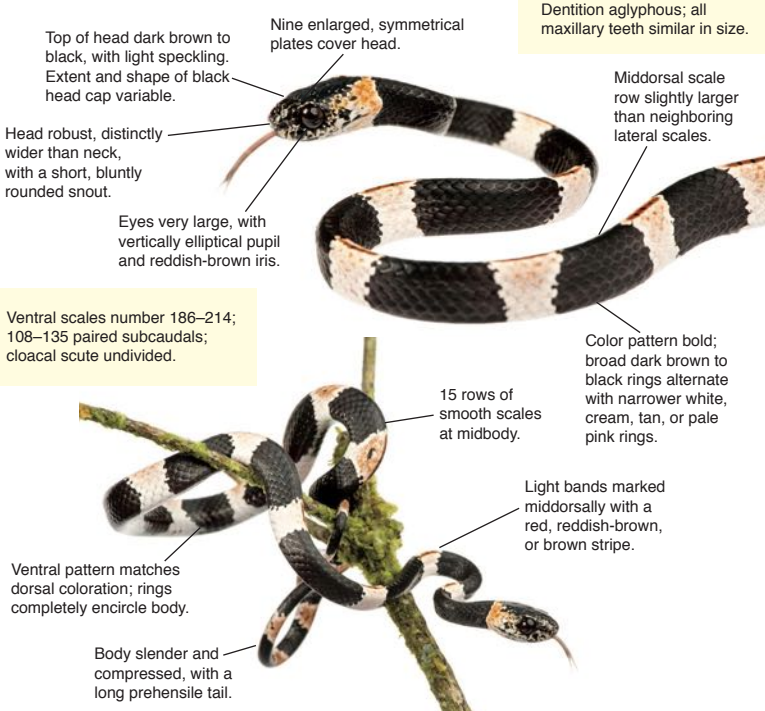
Dipsas articulata inserts its lower jaw into a snail's shell and uses its long teeth to hook the snail's body, which is then carefully extracted and eaten.

is eaten and the empty shell discarded. These docile snakes are completely harmless to humans and never attempt to bite.

Dipsas articulata is oviparous and produces small clutches of 1–3 eggs.

The taxonomic situation of this species in Costa Rica is not fully resolved, and some authors recognize two species of black-and-white ringed *Dipsas* in the country: *Dipsas articulata* and *Dipsas bicolor*, with only minor differences in coloration (presence or absence of red coloration in the white body rings) and scalation (minor variation in chin shields). These snakes are not very common in collections, but limited data shows considerable variation in individuals attributable to both tentative forms. In addition, the amount of red in their color pattern may change with age. For the time being, the author prefers to treat both as a single, variable species, *Dipsas articulata*, until more information is available.

Description



Similar species

- *Tropidodipsas sartorii* (p. 529) is mostly terrestrial and has a cylindrical body that is round in cross-section.
- *Sibon anthracops* (p. 504) has bright orange blotches in each light body ring and only 13 dorsal scale rows.
- *Leptodeira nigrofasciata* (p. 470) has a longer, more slender snout; its dark saddle spots do not continue onto the belly, which is uniform white.
- Juvenile *Pliocercus euryzonus* (p. 490) have a black and white ringed pattern; the shape of the long angular snout is quite different.
- Juvenile *Oxyrhopus petola* (p. 488) have cream and black bands that may be suffused with orange, but never completely encircle the body.
- *Sibon* (pp. 502–515) and *Imantodes* (pp. 464–469) species have a similar body shape and blunt-snouted head, but very different coloration.

Dipsas tenuissima

Near threatened

Black-faced Thirst Snake (*Caracolera Grisácea*)

A skinny snake with a distinctly compressed body, large eyes, and vertically elliptical pupils. Broad black bands alternate with narrower white to silver-gray ones; all bands completely encircle the body and tail, except on the front third of the body; light-colored rings heavily mottled with dark pigment. Total length to 27.6 in (70 cm).

Dipsas tenuissima occurs in the Pacific lowlands and foothills of southwestern Costa Rica and adjacent Panama; from near sea level to 3610 ft (1100 m).

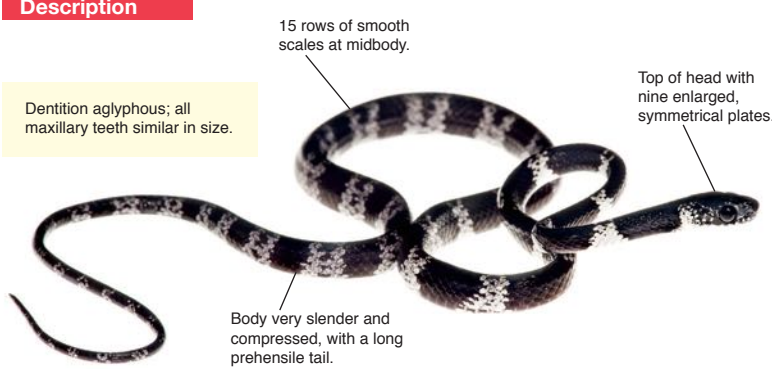
Natural history

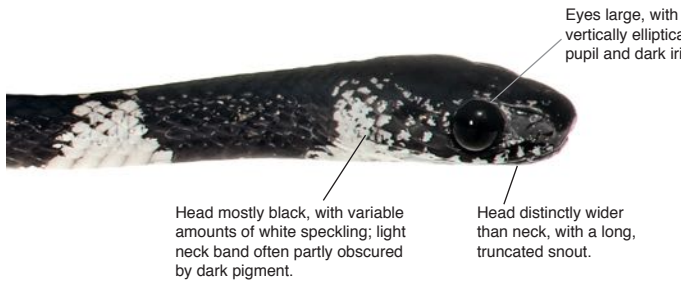
An uncommon species of relatively undisturbed lowland and foothill forests. This is another "goo-eater," specialized in eating slugs and snails. It has several adaptations to its dentition, skull, and head musculature to enable it to extract snails from their shells, and to hold on to slippery prey. The long, slender body and prehensile tail make it well-suited for a life in the trees. *Dipsas tenuissima* is nocturnal and usually encountered at night as it moves slowly through low vegetation in search of prey. It is mostly found during rainy periods of the year, and occupies microhabitats where humidity remains relatively high, such as the vegetation surrounding wetlands, swamps, and streams. During periods of unsuitable weather, these snakes may hide under bark, in tree cavities, or ascend into the canopy, which may explain why there are so few records of this species. *Dipsas tenuissima* was recently documented at Las Cruces Biological Station near San Vito, extending the upper elevational limit of this species; it is likely more common and widespread than currently assumed.

Because it is rarely seen, only very limited information is available on *Dipsas tenuissima*. It is oviparous, like other species in the genus, but it is not known how many eggs it produces or when.

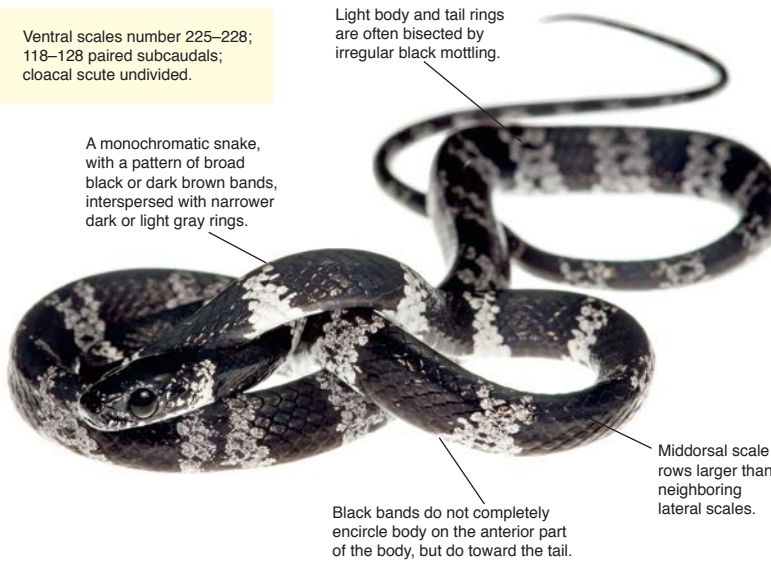
Description

Dentition aglyphous; all maxillary teeth similar in size.





Ventral scales number 225–228; 118–128 paired subcaudals; cloacal scute undivided.



Similar species

- *Sibon nebulatus* (p. 514) can appear quite similar in dorsal coloration, but its dark bands do not completely encircle the body. It generally has a more robust, shorter-snouted, and wider head.
- Adult *Sibon dimidiatus* (p. 508) can have a pattern of dark gray or dark brown bands, interspersed with diffuse orange, salmon, or tan bands; the body bands do not completely encircle the body.
- *Dipsas articulata* (p. 434) has orange or salmon-colored mottling or markings in the light body rings, not gray.
- *Imantodes* species (pp. 464–469) have a similar body shape, but a different color pattern (uniform tan or with brown saddle spots), and a proportionally wider head with huge eyes.

Enuliophis sclateri

White-headed Snake (*Cabeza Blanca*)

Least concern

A slender snake with a long tail. Has a dark gray to black dorsum, light belly, and unique "panda bear" head pattern consisting of a white cap, black snout, and black rings around its eyes. Total length to 21.6 in (55 cm).

Enuliophis sclateri is known from scattered localities along both the Pacific and Atlantic slopes, between southeastern Nicaragua and Colombia; from near sea level to 4595 ft (1400 m).

Natural history

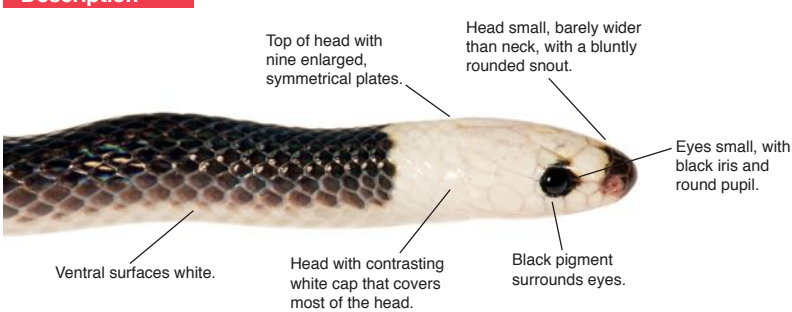
Enuliophis sclateri, the only species in its genus, was recently separated from the genus *Enulius* based on differences in hemipenis morphology. Like the species in the latter genus, *Enuliophis sclateri* feeds on small reptile eggs, which it opens using the enlarged rear fangs. It is not known whether this species also feeds on large reptile eggs that are too big to fit in its mouth, as does *Enulius flavitorques*. The enlarged rear fangs in this species are not associated with a venom gland, but rather seem to serve the purpose of slicing through egg shells; these small snakes are perfectly harmless.

This is a fossorial or semi-fossorial species, usually seen moving through leaf litter on the forest floor during the day, but sometimes also at night. *Enuliophis sclateri* inhabits forested areas and is generally restricted to spots with substantial tree cover. It does tolerate some habitat alteration, however, and it has been found in areas with regenerating forest, as well as in an abandoned, overgrown banana plantation.

Enuliophis sclateri has a characteristically long and thick tail that breaks off easily as an antipredator response. Many individuals have an incomplete tail, a sign of a prior predator's attack. Sections of the tail break off when restrained and will continue to wiggle for several minutes after being separated, providing the snake valuable time to escape while the predator is distracted.

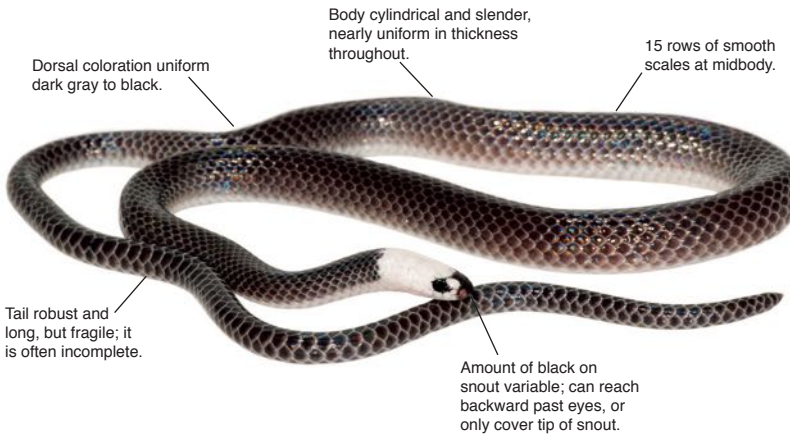
Enuliophis sclateri is oviparous and generally produces up to two eggs at a time. Egg clutches have been reported during April and May, but the reproductive cycle of this species is not well known. Reproduction may take place over a prolonged period and may be seasonal, mostly influenced by local climate conditions.

Description



Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 129–151; 96–100 paired subcaudals; cloacal scute divided.



Some *Enuliophis sclateri*, particularly in Pacific slope populations, have a more extensive black head cap that covers the entire top of the snout and includes the eyes.

Similar species

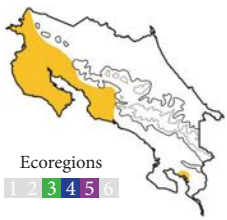
- Juvenile *Ninia celata* (p. 478) have a black body and head cap, as well as a white band across the back of the head and the neck, but all their dorsal scales are heavily keeled.
- No other Costa Rican snakes have a white head cap that covers most of the head, including the eyes.

Enulius flavitorques

Least concern

Pacific Long-tailed Snake (*Cabeza Puntiaguda*)

The combination of a very long, thick tail, pointed snout profile, a uniformly dark gray to brown dorsum, and at least an indication of a light collar is usually sufficient to identify this species. Total length to 19.6 in (50 cm).



Enulius flavitorques occurs on the Pacific slope, from central Mexico to Colombia; it also crosses on to the Atlantic slope in northern Colombia, eastern Panama, Nicaragua, and Honduras. Mostly found in dry lowland areas, it also occurs locally in the western Central Valley and was recently found near Golfito; from near sea level to 4100 ft (1250 m).

Natural history

Enulius flavitorques is a fairly common snake, but due to its nocturnal and fossorial habits it is infrequently enountered. On dark, humid nights they are sometimes seen on the surface, crawling through the leaf litter. However, individuals are more often found during the day as they hide under rocks, logs, and debris. They can also be found inside termite nests, ant nests, and within the decaying logs and stumps that such nests are often associated with.

Recent observations show that these snakes may sometimes display arboreal activity, as individuals were reported climbing up trees and rocks, as high as 9.2 ft (2.8 m) above the ground. One individual was observed climbing toward an arboreal termite nest, which contained a communal nest of leaf-toed geckos (*Phyllodactylus*). *Enulius flavitorques* feeds primarily on small to relatively large reptile eggs (such as those of *Iguana iguana*, and possibly of sea turtles). Small eggs are taken into the mouth and punctured with the greatly enlarged teeth in the rear of the mouth, after which the egg is collapsed and the content squeezed out into the snake's mouth. In a recent report, these small snakes were shown to also predate large reptile eggs that are many times larger than their head. Such large eggs are punctured with the rear fangs, after which the snake inserts its head entirely into the egg and consumes its contents.

Enulius flavitorques is usually found in relatively dry habitats and, in Costa Rica, was long thought to be restricted to the country's dry northwestern region and parts of the Central Valley. However, this species was recently discovered in the Golfito area in southwestern Costa Rica, and it is clearly more widespread and adaptable than previously thought.

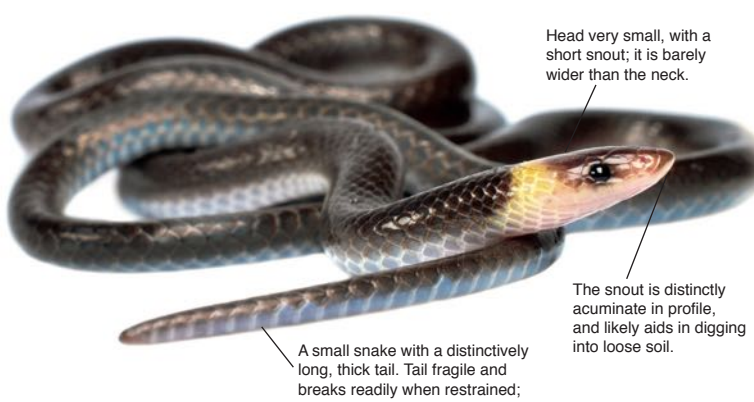
The characteristically long tail in *Enulius flavitorques* serves an antipredator function; when restrained, the tail readily breaks off. The severed section of the tail continues to twitch and move for several minutes and distracts the predator, while the snake attempts to escape to safety. Many individuals seen in the wild have an incomplete tail, a testament to the effectiveness of this strategy and indicative of the predation pressure small snakes are subject to. Unlike in lizards, lost sections of the tail do not regrow in snakes.

This is an oviparous species, known to produce clutches of 1 or 2 eggs at a time.

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales number 165–216; 85–121 paired subcaudals; cloacal scute divided.



Similar species

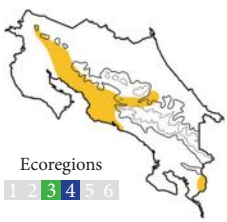
- Other small fossorial snakes with a light nuchal collar (e.g., species of *Tantilla, Trimetopon*, and *Geophis*) all lack a long, thick tail.
- *Enuliophis sclateri* (p. 438) has a similar body shape but has a contrasting white head and a black spot surrounding each eye, or a black head cap and a white band across the head in some populations.

Erythrolamprus bizona

Least concern

Black-ringed False Coral (*Falsa Coral de Nariz Manchada*)

Relatively slender and medium-sized. A black head cap and myriad pale scales stained with black pigment adorn the head. Red, black, and white rings completely encircle its body; each red body ring is bordered on either side by a black ring. It is the only coralsnake mimic that has two black rings in the neck area, separated by a cream or white ring (may be obscured in large adults). Total length to 39.4 in (100 cm).



Erythrolamprus bizona occurs from northern Costa Rica to Colombia and adjacent Venezuela; while mainly found on on the Pacific slope, it crosses on to the Atlantic slope in some locations. In Costa Rica, it is mostly found in Pacific lowlands and foothills, excluding the dry northwest, throughout both the Pacific and Atlantic sides of the Central Valley, as well as in the border region with Panama; from near sea level to 5250 ft (1600 m).

Natural history

This is a relatively uncommon species whose bright red, white, and black color pattern resembles that of venomous coralsnakes (genus *Micrurus*); even though it is not closely related, this "false coralsnake" shares many aspects of its appearance and diet, and some behavioral traits, with true coralsnakes.

Erythrolamprus bizona is a terrestrial, diurnal snake that generally avoids exposure to bright, direct sunlight. In most cases, it is found active in shaded spots well within the dark forest interior; it is often seen during overcast weather, or at dawn and dusk. *Erythrolamprus bizona* feeds mostly on other snakes, but reportedly also eats lizards. Prey is subdued with a moderately toxic venom that is delivered through enlarged fangs in the back of the mouth. Bitten snakes show signs of paralysis, internal bleeding, blistering, and localized swelling; *Erythrolamprus bizona* delivers multiple bites as it manipulates its prey into a position suitable for swallowing it. Interestingly, unlike most other snake-eating snakes, members of the genus *Erythrolamprus* tend to swallow their prey tailfirst.

Erythrolamprus bizona has an erratic defensive behavior that is similar to that of venomous coralsnakes, in which the snake flattens its body, hides its head under a body coil, and raises the short tail upward in a tight coil, as if creating the appearance of a fake head. When touched, but sometimes without a trigger, the snake will rapidly and erratically thrash its tail and body sideways, and resume the protective position with its head hidden and tail presented to a predator. Individuals may attempt to bite in a sideways strike when a predator (or human) touches the raised tail but may also do so when handled. The venom of *Erythrolamprus bizona* causes pain, bleeding, and swelling at the bite site in humans; in rare, more severe, cases people have reported a feeling of general discomfort, and these snakes should be handled with care.

The order in which the colored rings are arranged in *Erythrolamprus bizona* differs from the color pattern seen in co-ocurring venomous coralsnakes (e.g., *Micrurus nigrocinctus*), in that each of its red rings is bordered on both sides by a black ring (in all Costa Rican tricolored coralsnakes, a red ring is always bordered by a light-colored ring). It has been suggested that resembling a coralsnake may provide some protection from snake-eating snakes, presumably because coralsnakes were thought to not eat their own kind. Not only do venomous coralsnakes eat members of their own species at times, but *Erythrolamprus bizona* has been reported to eat another coralsnake mimic, *Tantilla supracincta*.

This species is oviparous and produces clutches of up to nine eggs, which reportedly are laid at the start of the rainy season (May–July). Eggs hatch in just under three months, and small juveniles can be expected during the rainy season (July–November).

Description

Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Ventral scales 180–204; 45–62 paired subcaudals; cloacal scute divided.

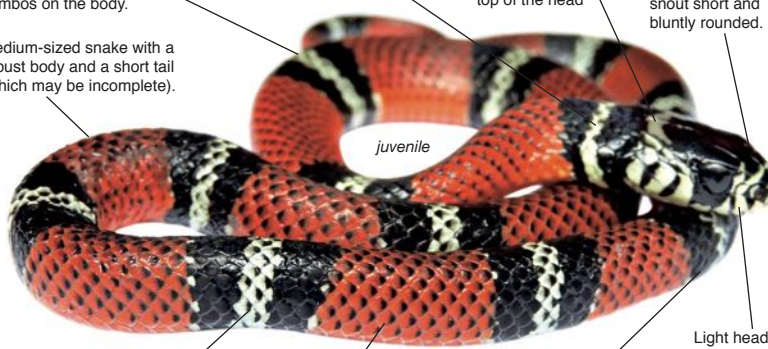
Characteristically has two black bands that are separated by a narrow white or cream band across the back of the head and neck (can be obscured in large adults).

Head white to cream, with a black band across the snout that extends backward in a V-shape onto the top of the head

Typically, there are 13–16 black-white-black combos on the body.

Head only slightly wider than neck; snout short and bluntly rounded.

Medium-sized snake with a robust body and a short tail (which may be incomplete).



Body and tail coloration coralsnake-like but arranged differently: wide red rings are interspersed with narrower sets of black-white-black rings that all completely encircle the body.

15 rows of smooth scales at midbody.

Eyes fairly large and completely contained within black head cap; pupil round, iris black.

Light head scales have black margins.

In large adult *Erythrolamprus bizona*, the characteristic double black neck rings may fuse to form a single, broad black neckband. Also note how in a few places the black-white-black rings are offset midorsally, and don't quite connect.

Similar species

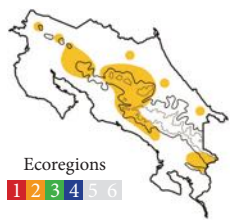
- On *Erythrolamprus mimus* (p. 446), the red body rings are bordered by white rings on both sides; black rings are dorsally split with white markings.
- *Lampropeltis abnorma* (p. 357) and *Lampropeltis micropholis* (p. 359) have more than 19 dorsal scale rows and lack the two black rings in the neck area (separated by a cream or white ring).
- In *Tantilla supracincta* (p. 410), the coralsnake pattern does not extend onto the belly.
- *Rhinobothryum bovallii* (p. 386) has a distinctly compressed body, huge nostrils, and a strikingly different head pattern.
- On *Micrurus* species (pp. 549–561), which are venomous, the red body rings are bordered on both sides by light-colored rings, not black ones.

Erythrolamprus epinephelus

Least concern

Fire-bellied Snake (*Falsa Coral de Quebrada*)

A beautiful, slender snake with a unique black-checkered red venter and alternating orange and black transverse bands on the dorsal surfaces of the anterior portion of the body; predominantly gray or black, with a pattern of black spots or stripes on the posterior portion of the body and tail. Total length to 31.5 in (80 cm).



Erythrolamprus epinephelus has a disjunct distribution, from northern Costa Rica to Colombia and Ecuador. From near sea level to 7220 ft (2200 m); more common at middle and high elevations than in the lowlands.

Natural history

This beautiful, diurnal snake occurs in disjunct populations; it can be fairly common at some localities but is often absent from other areas that appear equally suitable. *Erythrolamprus epinephelus* is found in wet areas in a variety of habitats, including open pasture and scrubland, rainforests, and cloud forests. It preys on litter frogs and rain frogs (genera *Craugastor* and *Pristimantis*) but was also observed eating a juvenile and tadpoles of the brilliant forest frog (*Rana warszewitschii*), as well as tadpoles of green climbing toads (*Incilius coniferus*). *Erythrolamprus epinephelus* can eat toxic species of amphibians such as the variable harlequin toad (*Atelopus varius*) and various poison-dart frogs (family Dendrobatidae), apparently without suffering any detrimental effects. The mechanism by which it overcomes the toxicity of these amphibians is not known, but the unusually enlarged adrenal glands found in this species may possibly play a role.

Erythrolamprus epinephelus has an array of strategies to deter potential predators. When threatened, it spreads its ribs in a cobra-like fashion, flattens its body, and exposes the bright orange and black pattern on the skin between its scales, a pattern that is largely concealed when the body is not distended. Flattening the body makes the snake look larger, and thus more intimidating and harder to eat. The sudden exposure of brightly colored surfaces that were previously hidden (the "flash color" effect), helps to confuse predators. The pattern of alternating orange and black bands somewhat resembles that of the bicolored coralsnake (*Micrurus multifasciatus*), and *Erythrolamprus epinephelus* might be considered a mimic of this dangerously venomous coralsnake. Other means of defense include a vibrating tail tip, which produces an audible buzz when rattled against dry leaves or a hard surface, and the presence of paired glands close to the vent. When the snake is grabbed, it empties these glands, which contain an extremely foul-smelling musk. If all else fails, this snake will bite.

Erythrolamprus epinephelus lays eggs; females are known to produce clutches of up to ten eggs, reportedly during the end of the dry season and beginning of the rainy season (February through June). Incubation may last up to three months. An observation of a mating aggregation, containing one female and several males attempting to mate with her, provides an intriguing glimpse into possible courtship behavior in this species and the likelihood that pheromones may be released by a female to attract nearby males.

The taxonomic history of this species has long been confusing, with previous placement in the South American genera *Leimadophis* or *Liophis*. A recent revision of many dipsadine snakes based on molecular traits resulted in the placement of this species in the genus *Erythrolamprus*. Given that there are many morphological, behavioral, and other biological differences between this species and the two other members of the genus *Erythrolamprus* that occur in Costa Rica, this reclassification seems illogical; some authors continue to refer to this species by its previous epithet, *Liophis epinephelus*.

Description

Top of the head uniform gray, bordered posteriorly by a black nuchal collar.

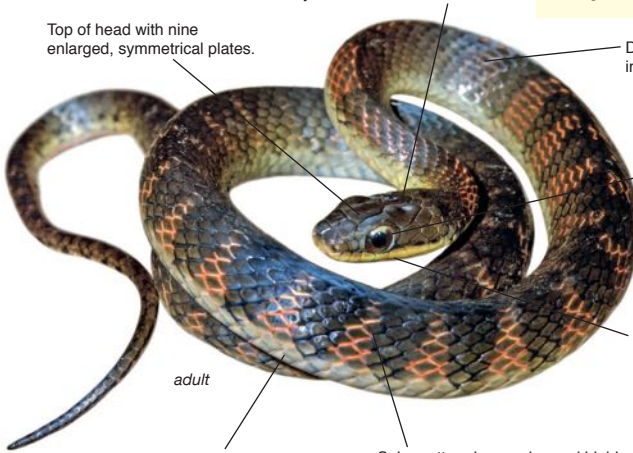
Dentition opisthoglyphous; has enlarged rear maxillary teeth.

Top of head with nine enlarged, symmetrical plates.

Dorsal scales smooth, in 17 rows at midbody.

Eyes relatively large, with round pupils and a copper-colored iris.

Labial shields white in juveniles, and cream to yellow in adults.



adult

Ventral surfaces of the head, chin, and throat creamy white, gradually changing into bright orange-red on the belly and the underside of the tail. Red ventral scales boldly marked with large, squarish black spots.

Color pattern is complex and highly variable. Posterior portion of body and tail generally dark olive to gray, usually with some black and white markings that may gradually transform into a pattern of black lateral stripes on the tail.

Ventral scales number 139–152; 51–63 paired subcaudals; cloacal scute divided.

Front of body is orange-red, with a series of black transverse bands. In a threat display, the body is flattened, showing bright orange skin between scales.

Orange coloration most vibrant in juveniles; it generally darkens with age.

Similar species

- *Thamnophis marcianus* (p. 544) has a pattern of alternating orange and black squarish blotches, but has strongly keeled dorsal scales.
- *Ninia psephota* (p. 482) sometimes has a dorsal pattern of black and yellow or orange-colored vertical bars, but it has strongly keeled dorsal scales.
- *Oxyrhopus petola* (p. 488) has black and orange bands on its dorsum, but a uniformly white venter.
- *Pliocercus euryzonus* (p. 490) has a series of black and cream rings that completely encircle the body and tail; in most adults the cream rings are suffused above with bright orange or red pigment.

Erythrolamprus mimus

Least concern

Central American False Coral (*Falsa Coral de Cabeza Anillada*)

Relatively slender and medium-sized, with a black head cap, white band across the head, and red, black, and white rings that completely encircle the body. Unlike all other coralsnake mimics, on this species each black ring is split dorsally by a poorly defined white mark. Total length to 25.6 in (65 cm).

Erythrolamprus mimus occurs on the Atlantic slope, from eastern Honduras to Costa Rica; on the Pacific slope, it occurs in southwestern Costa Rica, Panama, and northern South America (Colombia, Venezuela, Ecuador, and northern Peru). From near sea level to 4265 ft (1300 m).

Natural history

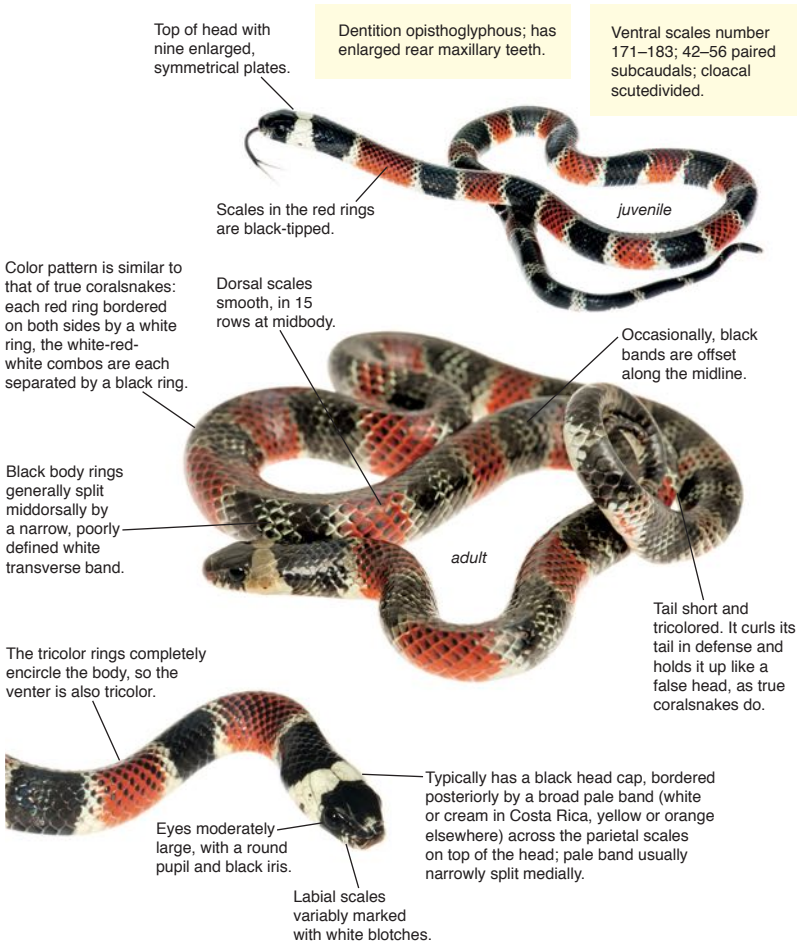
Erythrolamprus mimus is a common snake of forest interiors. Its bright red, white, and black color pattern resembles that of venomous coralsnakes (genus *Micrurus*), and it is therefore commonly called a "false coralsnake." Its habitat preference and diet are also comparable to that of true coralsnakes, but the two are not closely related. This secretive, terrestrial snake is generally most active under low light conditions, in the dark interior of forests, on overcast days, and at dawn or dusk. It probes the leaf litter layer and enters burrows in search of prey. *Erythrolamprus mimus* feeds mostly on other snakes, but also reportedly eats lizards, caecilians, and the occasional frog. Although mostly terrestrial, individuals have been seen climbing into low vegetation to pursue arboreal snakes. Prey is seized at midbody and injected with a venom, using the enlarged fangs in the back of the mouth. Victims develop swelling and significant bleeding at the site of each bite and succumb quickly to the venom. *Erythrolamprus mimus* will slowly "walk" its jaws towards the back of the prey's body, repeatedly puncturing the skin and injecting more venom with each bite. Typically, prey is swallowed tailfirst; most other snake-eating snakes swallow their prey headfirst.

When first encountered, *Erythrolamprus mimus* will attempt to flee; if cornered or picked up, it will flatten its body to appear larger, hide its head under a body coil, and raise the short tail upward in a tight coil, as if presenting a fake head. At times, the snake will rapidly and erratically thrash its tail and body sideways and then resume the protective position, with its head hidden and tail presented to a predator; true coralsnakes of the genus *Micrurus* engage in identical defensive behavior. A low percentage of individual *Erythrolamprus mimus* are missing part of their tail, indicating that this strategy is at least sometimes effective. Individuals may attempt to bite in a sideways strike when a predator (or human) touches the raised tail. Its venom has noticeable effects on humans, causing pain, bleeding, and swelling at the bite site; in rare, more severe, cases people have reported a general feeling of discomfort, and caution should be taken when handling these snakes.

The colored rings are arranged in the same order as that of some co-ocurring venomous coralsnakes (e.g., *Micrurus alleni, Micrurus clarki, Micrurus mosquitensis*, and *Micrurus nigrocinctus*). The coralsnake-like pattern is most vibrant and crisp in juvenile *Erythrolamprus mimus*; juveniles have a bicolored, black and white pattern on the head and tail, like venomous coralsnakes. Most often, the color pattern of juvenile *Erythrolamprus mimus* shows an offset in the color bands along the body's midline. In older individuals, the colored bands become more diffuse because the red scales gradually acquire black tips and the black bands become interrupted by a central band of light speckling.

This species is oviparous and produces clutches of up to eight eggs. Small juveniles are often seen at the end of the dry season or at the start of the rainy season (late February to April).

Description



Similar species

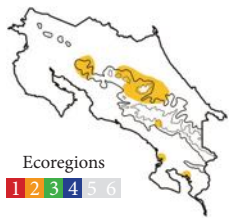
- On *Erythrolamprus bizona* (p. 442), each black ring is divided by a white ring, and all red body rings are separated from one another by a black-white-black combination.
- In *Lampropeltis abnorma* (p. 357) and *Lampropeltis micropholis* (p. 359), each red band is bordered on both sides by a black band.
- On *Tantilla supracincta* (p. 410), each red band is bordered by black bands on both sides; bands do not completely encircle the body.
- *Rhinobothryum bovallii* (p. 386) has a distinctly compressed body, huge nostrils, and a strikingly different head pattern.
- *Micrurus* species (pp. 549–561), which are venomous, have a clearly delineated color pattern throughout their life. Their black body rings are never partially split dorsally by white; *Micrurus* also have tiny black eyes and a more rounded head shape.

Geophis brachycephalus

Least concern

Costa Rican Earth Snake (*Culebra de Tierra Costarricense*)

A small snake with a slick bullet-shaped head, tiny dark eyes, and a very short tail. Black or gray; often marked with red stripes or blotches. Has tiny supraocular scales and distinctly keeled scales on entire body and tail. Total length to 18.1 in (46 cm) in females, 16.5 in (42 cm) in males.



Geophis brachycephalus occurs on the Atlantic slope in Costa Rica and western Panama. It occurs on the Pacific slope in the Central Valley, Tilarán Mountain Range, and southwestern lowlands. From near sea level to 6890 ft (2100 m).

Natural history

This is the most widespread of the Costa Rican *Geophis* species, and (with *Geophis hoffmanni*) one of the more commonly observed ones. It occurs throughout much of the country, in a wide variety of habitats, in pristine forests and urban settings. Most individuals are encountered during the day, beneath rocks, logs, or trash. At night, these snakes actively move about the forest floor in search of soft-bodied invertebrate prey. These fossorial snakes are known to enter insect burrows, tunnel through rotting logs, or even dig into moist loose soil using their smooth, bullet-shaped head to push into the substrate. An individual was found in a mound of sand containing a nest of leaf-cutter ants (*Acromyrmex octospinosus*), approximately 1.5 ft (50 cm) below ground. It was uncovered during excavation work in the early morning and was found crawling in a tunnel that had probably been made by the ants. Interestingly, after retrieving the *Geophis* from the insect burrow, a second snake emerged almost immediately after, this time a Costa Rican coralsnake (*Micrurus mosquitensis*), presumably in pursuit of the *Geophis*.

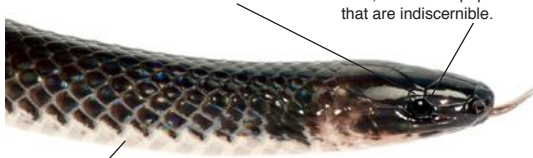
The stomach contents of various *Geophis* species have included insect larvae, earthworms, slugs, and leeches. An interesting observation reports the co-occurrence of individual *Geophis brachycephalus* and large, similar-looking terrestrial leeches. Below several logs, a snake was uncovered accompanied by one or more large leeches, each with a black body and a pattern of red spots. The leeches were of similar size, or larger, than the snakes. Both the leeches and the snakes were coiled tightly, almost forming a ball. There were no indications that the leeches preyed on the snakes or vice versa. *Geophis brachycephalus* is variable in its coloration. In some areas, one finds uniform gray or black individuals, in others individuals with red blotches or red stripes on a black background. The selective advantages of these different color morphs are as yet unknown.

Geophis brachycephalus is oviparous; it produces clutches of 3–6 eggs; eggs are buried in the soil. In captivity, eggs hatched after 109 days of incubation. The tiny hatchlings measured approximately 5.5 in (14 cm) in total length. This species appears to have a prolonged breeding season and possibly produces multiple clutches every year.

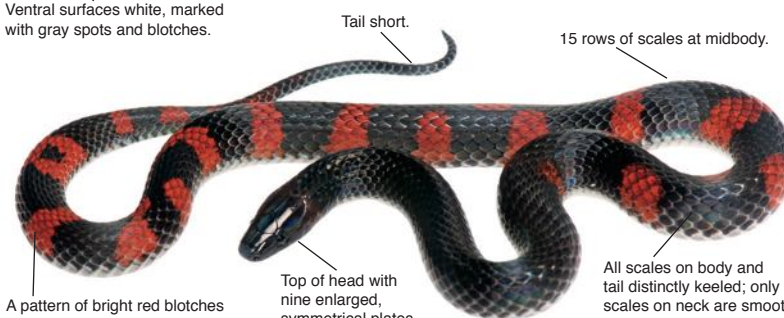
Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 131–148; 30–48 paired subcaudals; cloacal scute undivided.



Ventral surfaces white, marked with gray spots and blotches.



Dorsal coloration variable; can be uniform gray to black, but more often has distinct red markings (lateral stripes or dorsal blotches).

Striped individuals have a continuous reddish longitudinal stripe along each side of body and tail.

Similar species

- *Geophis hoffmanni* (p. 454) has smooth scales on most of its body and tail (keels may be present near the vent).
- *Geophis ruthveni* (p. 456) has a dark transverse stripe on each ventral scale and has keeled scales on the posterior half of its body and tail.
- *Geophis downsi* (p. 450) lacks supraocular scales.
- *Geophis talamancae* (p. 458) has distinctly keeled scales on the posterior part of its body and tail.
- *Geophis zeledoni* (p. 460) has smooth dorsal scales and a dark venter.

Geophis downsi

Data deficient

Black Earth Snake (*Culebra de Tierra Negra*)

A very small, dark gray snake with a bullet-shaped head, tiny dark eyes, and greatly reduced head scales that lack supraoculars. It has keels on at least the uppermost scale rows of the posterior part of the body and tail. Total length to 9.8 in (25 cm).

Geophis downsi is endemic to Costa Rica. It is only known from the vicinity of San Vito, in southwestern Costa Rica; 3610–3940 ft (1100–1200 m).

Natural history

Based on our current understanding of this relatively uncommon species, *Geophis downsi* is only found in a small area of predominantly premontane rainforest near San Vito, in southwestern Costa Rica. Because it superficially resembles several other uniformly colored *Geophis* species in the country, however, it is easily misidentified, and it may be more widespread than currently thought.

Geophis downsi is found beneath logs, rocks, and other cover objects. These small snakes are mostly nocturnal and at night they may be seen crawling around on the forest floor or in the leaf litter of forests, gardens, or even agricultural areas. *Geophis* species are generally seen when active on the surface, but they are also known to enter insect burrows, or use their bullet-shaped head to push into humid, loose soil and tunnel through. Their tiny eyes and characteristically reduced head scales are adaptations to life underground.

Geophis downsi presumably feeds on worms, insect larvae, and other soft-bodied invertebrates. Reproductive data is lacking, but this species is thought to be oviparous.

Description

Dentition aglyphous; all maxillary teeth

Ventral scales 122–135; 41–46 paired subcaudals; cloacal scute undivided.

A tiny, slender snake with a cylindrical body, short tail, and very small head.

15 rows of scales at midbody; smooth on the anterior half of the body and distinctly keeled on the posterior half of the body and tail.

Keels most prominent on middorsal scale rows.

Eyes very small and dark, with round pupils that are indiscernible.

Top of head with seven enlarged, symmetrical plates; differs from most other species in lacking supraocular scales.

Dorsal coloration of head, body, and tail uniform dark gray to nearly black. Venter white with dark crossbands; each ventral scale has a dark anterior margin. Juveniles have a uniform light venter and a light nuchal collar; both darken with age.

Similar species

- *Geophis brachycephalus* (p. 448), *Geophis hoffmanni* (p. 454), and *Geophis talamancae* (p. 458) share uniformly dark dorsal surfaces but have supraocular and postocular scales.
- *Geophis godmani* (p. 452) lacks supraocular scales, but typically has a cream to bright yellow venter and a light-colored snout tip.
- *Ninia psephota* (p. 482) has a bluntly rounded snout and its body and tail are covered with more than 15 rows of strongly keeled scales.

Geophis godmani

Least concern

Yellow-bellied Earth Snake (*Culebra de Tierra de Vientre Amarillo*)

A small, dark snake with a bullet-shaped head, tiny eyes, and greatly reduced head scales. It is the only *Geophis* species that lacks supraocular scales, has smooth scales covering its body and tail, and also has a prominent light (white, cream, or yellow) snout tip and venter. Total length to 15.7 in (40 cm).

Geophis godmani occurs in isolated populations in the highlands of Costa Rica (Tilarán, Central, and Talamanca mountain ranges) and adjacent western Panama; 3280–6890 ft (1000–2100 m).

Natural history

Geophis godmani is a relatively common fossorial species of montane forests. It is often found in relatively open areas, beneath logs, rocks, clumps of vegetation, or other surface debris. Like other species of *Geophis*, it hides during the day but leaves its hiding places after dark to hunt for soft-bodied invertebrates such as worms and insect larvae. Individuals have been recorded digging in loose soil and in insect burrows, including leaf-cutter ant tunnels, up to 1.5 ft (50 cm) below the surface. *Geophis godmani* has been found in aggregations consisting of up to 16 individuals, and other species of snakes have been reported to associate with such aggregations (e.g., *Geophis brachycephalus*, *Ninia psephota*, and *Rhadinella serperaster*). *Geophis godmani* is oviparous; a cluch of three eggs was discovered below a board on the edge of a pasture.

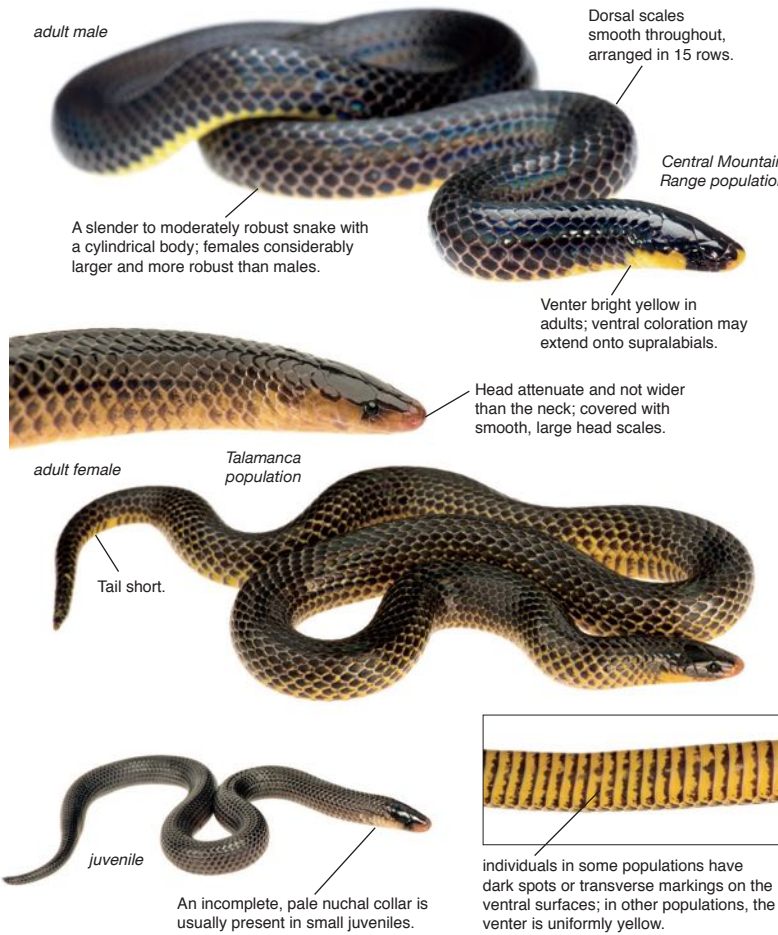
This species occurs in isolated populations in the highlands of Costa Rica and western Panama. Individuals from the Central and Tilarán mountain ranges are generally jet-black dorsally, with bright yellow ventral surfaces and a yellow snout tip. However, populations from the southern Talamanca Mountain Range, near the border with Panama, tend to be larger and have a different color pattern consisting of a more muted dark brown or dark gray dorsum with cream mottling, and a dull yellowish-cream venter. The tip of the shout is generally lighter in color than the rest of the head, but is pink or cream, not bright yellow. Given the genetic isolation of the various highland populations, it is very possible that *Geophis godmani* is actually a complex of different species.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 132–145; 26–38 paired subcaudals; cloacal scute undivided.

Dorsal surfaces uniform dark brown, purplish-brown, to almost completely black in Central Mountain Range populations; slate gray, variously mottled with light pigment in southern Talamanca Mountain Range populations. Contrast between light ventral and snout coloration and dark dorsal coloration more pronounced in northern populations.



Similar species

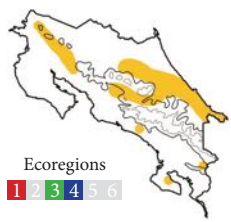
- *Geophis downsi* (p. 450) also lacks supraocular scales but never has a yellow venter or distinctly light-colored snout.
- *Geophis brachycephalus* (p. 448) has most dorsal scales keeled, and often displays a pattern of red blotches or stripes.
- *Geophis talamancae* (p. 458) has distinctly keeled scales on the posterior part of the body and tail, and each ventral scale is marked with a transverse black stripe.
- *Geophis zeledoni* (p. 460) has a black venter.
- *Ninia* species (pp. 478–485) have a bluntly rounded snout and 17–19 rows of strongly keeled dorsal scales.

Geophis hoffmanni

Common Earth Snake (*Culebra de Tierra Común*)

Least concern

A very small snake with a bullet-shaped head, tiny dark eyes, a very short tail, and greatly reduced head scales. Differs from other *Geophis* species in having smooth scales throughout, possessing supraocular scales, and having a uniform dark gray to black dorsum and uniform white undersurfaces. Total length to 11.8 in (30 cm).



Geophis hoffmanni ranges from southeastern Honduras to eastern Panama. In Costa Rica it occurs on both slopes, except for the dry northwestern region; it also occurs locally in the Central Valley. From near sea level to 3940 ft (1200 m).

Natural history

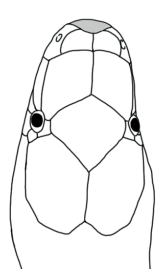
Geophis hoffmanni is a common species of pristine lowland and premontane forests; it is also common in disturbed areas such as plantations, pastures, and even gardens in suburban areas. Individuals are usually found during the day, hidden beneath surface debris, rocks and logs, and in dense clumps of vegetation. This species is crepuscular and nocturnal; it can be seen moving on or through the leaf litter and herbaceous ground cover after dark, in search of worms and other soft-bodied invertebrate prey.

Geophis hoffmanni is oviparous; egg clutches have been documented in November and December and contain up to five eggs.

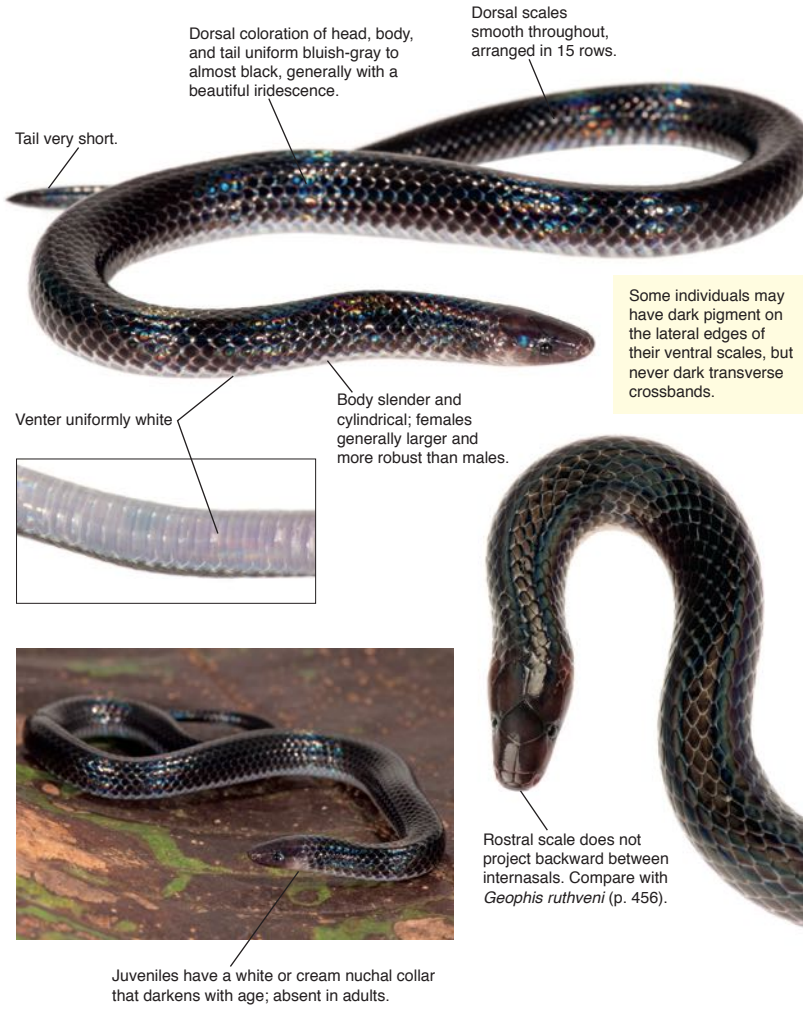
Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 118–130; 24–37 paired subcaudals; cloacal scute undivided.



Top of head with nine enlarged, symmetrical plates. Rostral scale indicated in gray.



Similar species

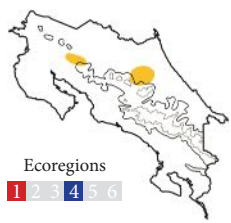
- *Geophis brachycephalus* (p. 448) has keeled dorsal scales; may be uniformly colored, but usually has red blotches or stripes.
- *Geophis ruthveni* (p. 466) has a dark transverse stripe on each ventral scale and has keeled scales on the posterior half of its body and tail.
- *Geophis downsi* (p. 450) lacks supraocular scales.
- *Geophis talamancae* (p. 458) has distinctly keeled scales on the posterior part of its body and tail.
- *Geophis zeledoni* (p. 460) has smooth dorsal scales but has a dark venter.
- *Ninia celata* (p. 478) has a bluntly rounded snout and strongly keeled dorsal scales in 19 rows.

Geophis ruthveni

Least concern

Stripe-bellied Earth Snake (*Culebra de Tierra de Collar*)

A very small snake with a bullet-shaped head, tiny dark eyes, a very short tail, and greatly reduced head scales. Differs from other *Geophis* species (except *G. talamancae*) in having strongly keeled scales only on the posterior part of the body and the tail. Rostral scale is long and projecting. Possesses supraocular scales and uniform dark gray to black dorsum; white ventral scales each marked with a dark transverse band. Total length to 12.2 in (31 cm).



Geophis ruthveni is endemic to Costa Rica; it is known from a few locations in the Atlantic lowlands, the Arenal region, and in the Peñas Blancas Valley, in the Tilarán Mountain Range; 330–5250 ft (100–1600 m).

Natural history

Geophis ruthveni is thought to be a rare species, but it is easily confused with the much more common species *Geophis hoffmanni*, and records of the latter species may include *Geophis ruthveni*. This small, secretive, fossorial snake inhabits relatively undisturbed lowland and premontane rainforests, where it is found under rocks, logs, and surface debris.

Presumably it feeds on worms and other soft-bodied invertebrates and their larvae and eggs, much like other species in its genus. All *Geophis* are oviparous.

Description

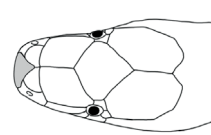
Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 122–142; 32–41 paired subcaudals; cloacal scute undivided.

Geophis ruthveni is nearly identical in appearance to *Geophis hoffmani*, but the keeled scales on the tail (seen here) and the dark-edged ventral scales are useful fieldmarks.

Rostral scale juts farther backward, separating internasals—compare with *Geophis hoffmani* (p. 454).

Venter dark; each ventral scale with a light posterior margin, creating a pattern of dark and light transverse stripes.



Top of head with nine enlarged, symmetrical plates. Rostral scale indicated in gray.

Similar species

- *Geophis hoffmani* (p. 454) has a white venter.
- *Geophis brachycephalus* (p. 448) has keels on most dorsal scales and often has a dorsal pattern of red blotches or stripes.
- *Geophis godmanni* (p. 452) has a bright yellow venter and usually a yellow snout.
- *Geophis talamancae* (p. 458) is geographically separated and differs in details of head scalation.
- *Ninia celata* (p. 478) has a bluntly rounded snout and 19 rows of heavily keeled dorsal scales.

Geophis talamancae

Endangered

Talamanca Earth Snake (*Culebra de Tierra de Cola Negra*)

A small snake with an attenuate head, tiny dark eyes, a short tail, and greatly reduced head scales. Differs from other *Geophis* species (except *G. ruthveni*) in having keeled scales on the posterior part of the body and the tail. Rostral scale short and rounded. Has supraocular scales; dorsum is uniform dark gray to black, white ventral scales are each marked with a dark transverse band. Total length to 10.6 in (27 cm).

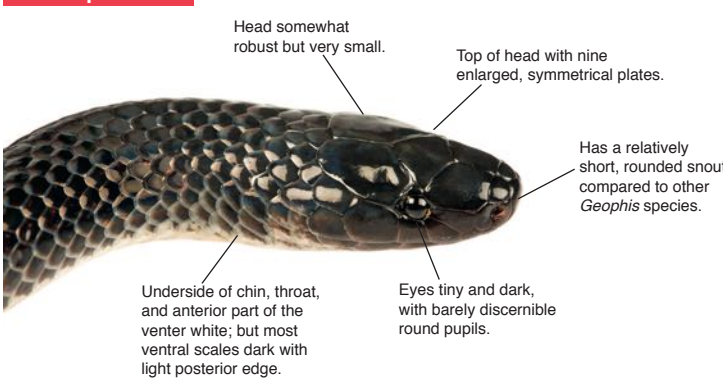
Geophis talamancae is only known from the Talamanca Mountain Range of extreme southern Costa Rica (Zona Protectora Las Tablas and Jurutungo); it likely also occurs in the adjacent highlands of western Panama; 5900–6400 ft (1800–1950 m).

Natural history

Until recently, *Geophis talamancae* was only known from a single specimen collected in the Las Tablas region of the southern Talamanca Mountain Range, near the border with Panama. In recent years, a few individuals have been reported from extreme western Panama within a few miles from where the holotype was collected. Interestingly, these Panamanian specimens displayed a pattern of discrete red saddle-like blotches on a black background, similar to the color pattern displayed by many *Geophis brachycephalus*. In March 2018, three individuals of this endangered species were uncovered during the day as they hid beneath boards in a garden in the Las Tablas area. These snakes were coiled up together with two checkered coffee snakes (*Ninia psephota*). An additional individual was found active on the surface at night in the same area.

Because it is nocturnal and fossorial—and because it occurs in areas that are rarely visited by biologists—*Geophis talamancae* is likely underreported. It is clearly adaptable and tolerates some degree of habitat alteration. Many high elevation species tend to leave closed canopy forest habitats and, at least temporarily, move into more open areas to find sunny basking spots. One of the recently observed *Geophis talamancae* was a gravid female found beneath a dark board, likely selected because it provided a warm place beneficial to embryonic development.

Description



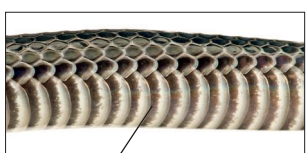
Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 138–140; 33–38 paired subcaudals; cloacal scute undivided.

Head, body, and tail uniform black above.

15 rows of scales at midbody; smooth on front of the body, but gradually becoming keeled on the posterior half of the body and tail.

Undersurfaces of posterior part of the body and tail mostly black.



Ventral scales marked with dark pigment; subcaudal scales, below tail, mostly black.

Some individuals display a *Geophis brachycephalus*-like pattern, with red saddle spots, as seen in this individual from western Panama. Only a handful of individuals of *Geophis talamanca* have ever been observed and little is known about how variable the color pattern of this species is.

Similar species

- *Geophis godmani* (p. 452) has a cream to bright yellow venter and usualy a yellow snout tip.
- *Geophis downsi* (p. 450) lacks postocular scales.
- *Geophis brachycephalus* (p. 448) has pronounced keels on all dorsal and caudal scales.
- *Geophis hoffmanni* (p. 454) has smooth scales throughout, except for a small patch near the vent.
- *Geophis ruthveni* (p. 456) is geographically separated and differs in details of head scalation.
- *Ninia psephota* (p. 482) has a checkered ventral pattern, a bluntly rounded head, and strongly keeled dorsal scales.

Geophis zeledoni

Least concern

Dark-bellied Earth Snake (*Culebra de Tierra de Vientre Oscuro*)

A small snake with a bullet-shaped head, tiny dark eyes, a short tail, and greatly reduced head scales. Differs from other *Geophis* species (except *G. hoffmanii*) in having smooth scales all over its body. Has supraocular scales, a uniformly black dorsum, and a completely dark venter. Total length to 16.5 in (42 cm).

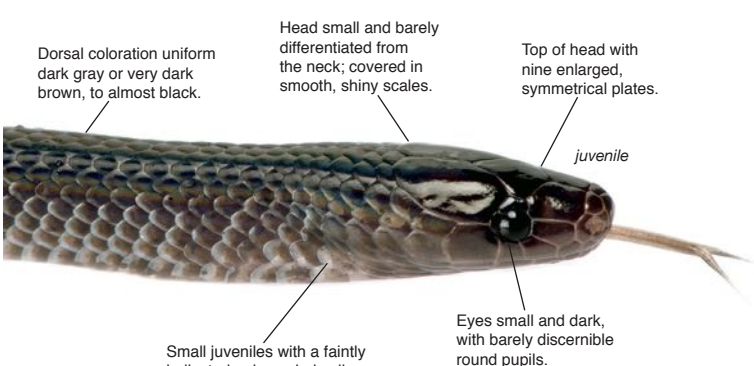
Geophis zeledoni is a Costa Rican endemic, known only from the Central Mountain Range; 5250–6560 ft (1600–2000 m).

Natural history

Geophis zeledoni has a limited distribution range and is uncommonly seen. During the day, these secretive, fossorial animals can be found hiding underneath logs, rocks, or other cover objects, while at night they actively hunt for soft-bodied invertebrate prey on the forest floor or in the leaf litter. This species is restricted to relatively undisturbed lower montane forests, but within this habitat type it can be found in more open areas, where sunlight reaches the forest floor. They are occasionally found in gardens and other landscaped areas, as long as the soil remains soft enough to bury into. Snakes of the genus *Geophis* use their bullet-shaped head to push through burrows and dig into loose soil in pursuit of invertebrate prey. Their reduced head scales and tiny eyes are adaptations to such a fossorial life, and aid in minimizing friction and irritation to the snake when burrowing.

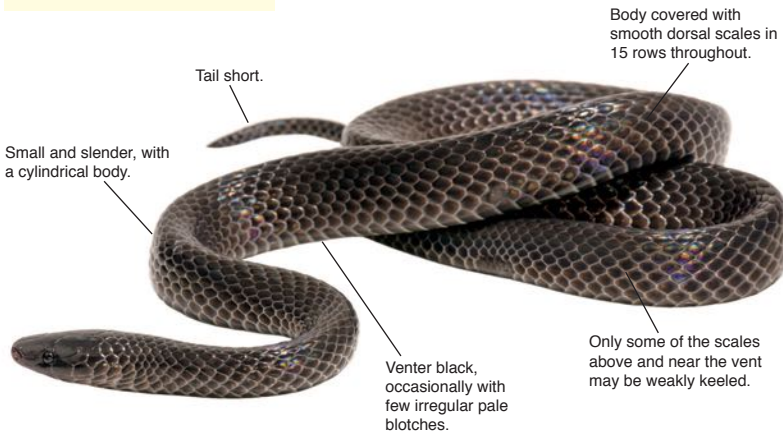
Geophis zeledoni is oviparous.

Description



Ventral scales number 141–150; 33–46 paired subcaudals; cloacal scute undivided.

Dentition aglyphous; all maxillary teeth similar in size.



Similar species

- *Geophis hoffmanni* (p. 454) has a light venter.
- *Geophis godmanni* (p. 452) has a bright yellow venter and usually a yellow snout tip.
- *Geophis brachycephalus* (p. 448) has pronounced keels on all dorsal and caudal scales and is often marked with red blotches or stripes.
- *Amastridium veliferum* (p. 418) has a black venter, but its head is distinctly chestnut-brown.
- *Ninia celata* (p. 478) has a bluntly rounded head and heavily keeled dorsal scales in 19 rows.

Hydromorphus concolor

Prawn Snake (*Camaronera*)

Least concern

A semi-aquatic snake. Has a cylindrical body, smooth dorsal scales, and dorsally directed nostrils; unique in having only a single prefrontal scale and a single internasal scale (not paired) on top of its snout. Total length to 31.5 in (80 cm).

Hydromorphus concolor occurs on the Atlantic slope, from extreme eastern Guatemala to central Panama. On the Pacific slope, it is found from southwestern Costa Rica to central Panama. From near sea level to 4920 ft (1500 m).

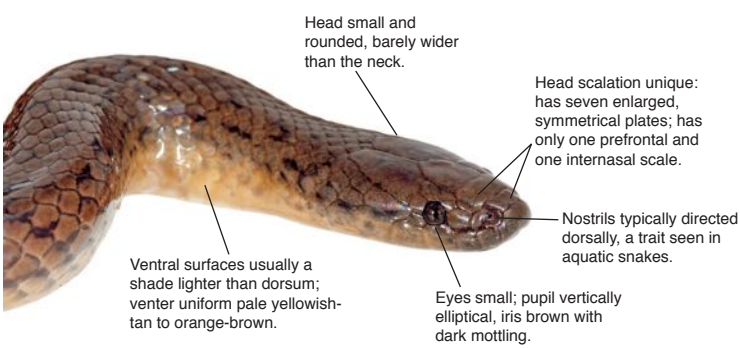
Natural history

Only two species comprise the genus *Hydromorphus*. The single species that occurs in Costa Rica, *Hydromorphus concolor*, is one of very few semi-aquatic snakes that occurs in the country. These shy, infrequently seen snakes associate with small, shallow streams in lowland and premontane forests. *Hydromorphus concolor* is mostly seen at night, when it crawls along the banks of streams and wetlands, or swims in search of prey. It appears to feed primarily on freshwater shrimp, but may also eat crabs, frogs, tadpoles, and fish. During, or immediately after, heavy rains, these snakes can occasionally be seen active in the daytime; they may move a considerable distance away from water during rainy spells.

Hydromorphus concolor typically has a single, large prefrontal shield, unlike the paired prefrontals usually seen in most other snakes in the country. In addition, it has dorsally directed nostrils, an adaptation to an aquatic life that allows this snake to breathe at the water surface with the least amount of its head protruding above the water line. Individuals are regularly seen with their body hidden between rocks, buried in mud, or within the debris on the stream bottom, with only the neck and head protruding from cover just far enough to reach the surface and breathe.

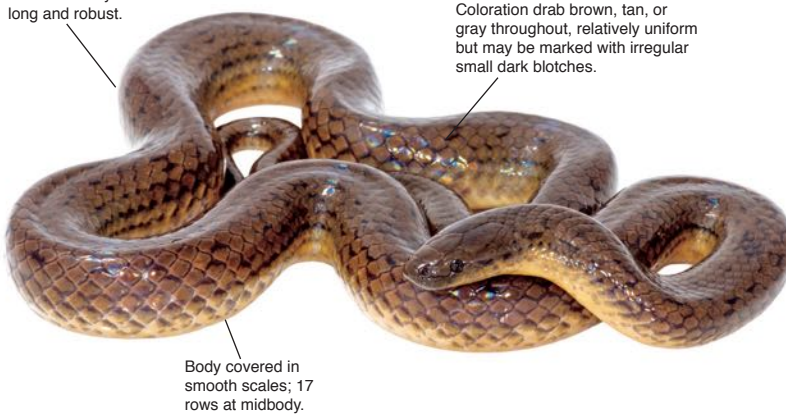
Hydromorphus concolor is oviparous and has been observed to produce clutches of up to eight eggs. In captivity, eggs hatched in November and December after incubating for approximately three months.

Description



Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 157–186; 31–54 paired subcaudals; cloacal scute divided.



Juveniles are similar to adults in all aspects, but tend to have a more boldly spotted dorsal pattern.

Similar species

- *Tretanorhinus nigroluteus* (p. 518) is another semi-aquatic snake; it differs in having keeled dorsal scales and paired prefrontal and internasal scales.
- Uniformly colored *Stenorrhina* have a very similar body shape, but always have paired prefrontal and internasal scales.

Imantodes cenchoa

Least concern

Common Blunt-headed Vine Snake (*Dormilona Común*)

An extremely thin arboreal snake with a compressed body, a proportionally wide blunt head, and very large eyes. Has a row of conspicuously enlarged middorsal scales that are 3–5 times as wide as the adjoining scale rows; dorsum has large, dark saddle-like markings. To 50.4 in (128 cm) in total length.

Imantodes cenchoa occurs from southern Tamaulipas and Oaxaca, Mexico, to Argentina, along both slopes; from near sea level to 5250 ft (1600 m).

Natural history

Imantodes cenchoa is a common, widespread snake that is encountered in a variety of humid forest habitats. Individuals can be found during the day hidden under the loose bark of standing trees or coiled in a bromeliad or on low vegetation. However, they are most often encountered after dark, when they become active. Individuals start moving at dusk, crawling slowly and with great deliberation. Active *Imantodes cenchoa* can be found close to the ground but are also seen in the tops of rainforest trees, more than 100 ft (30 m) above the ground. This species is highly arboreal and only rarely do individuals descend to the ground.

The elongated body and long, prehensile tail are both adaptations to arboreal life, as is their ability to cast the eyes downward. In cross-section, the compressed body of *Imantodes cenchoa* has the shape of an I-beam. Specially structured vertebrae have long, projecting dorsal spines for the attachment of extensive trunk muscles. This feature, combined with the prehensile tail, which serves as an anchor, allows these snakes to extend up to half of their entire body horizontally to bridge gaps between branches. Because of its very low body weight, individuals can move onto the very ends of the thinnest of twigs without breaking them.

The main advantage of these morphological adaptations is that *Imantodes* can go where few other snakes go. At night, the thin twigs and leaves on the outside of a bush or a tree's crown harbor sleeping anoles (genus *Anolis*), which are its favored prey. Its slender body enables *Imantodes cenchoa* to approach a sleeping lizard without shaking the branch it is on, and thus alerting and waking up the lizard. And, having the ability to extend its body for long distances allows this snake to reach over from nearby branches and grab the lizard without needing to climb the twig it is sleeping on.

The climbing ability of these delicate snakes is unmatched by any other Costa Rican species.

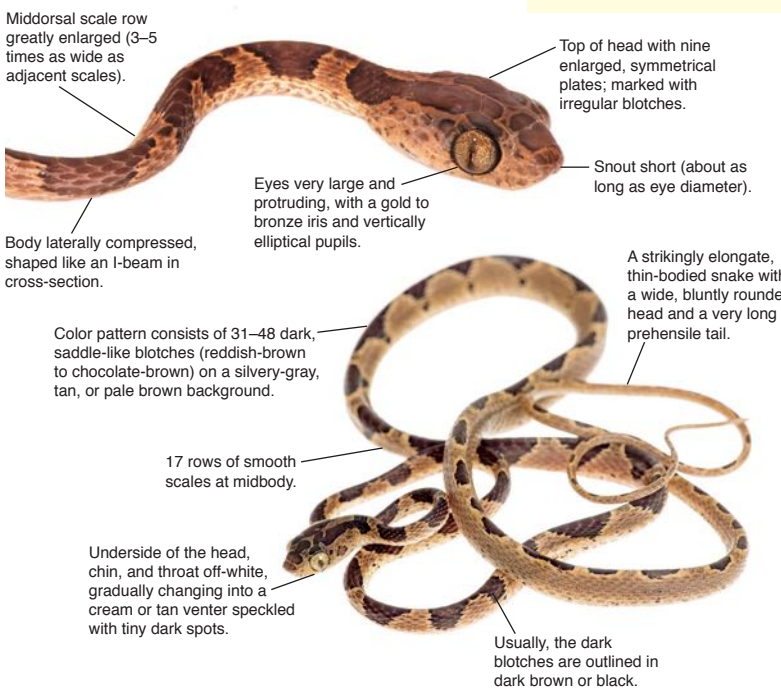
Once a lizard is located, it is caught with a quick strike and moved to the back of the mouth, where enlarged grooved fangs administer a mild venom. The delicate morphology of these snakes is not well suited to battle a struggling lizard for any duration, and the venom paralyzes its prey quickly. The venom poses no threat to humans, and these inoffensive snakes never attempt to bite when handled. Once the struggling lizard is immobilized, it is swallowed headfirst; it is fascinating to see this snake swallow a lizard whole that is several times the width of the snake's neck!

Imantodes cenchoa is oviparous and produces clutches of up to eight slender, elongate eggs. Young juveniles have been observed from March through November, suggesting that reproduction either takes place over a prolonged period of time or even year-round.

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 228–278; 146–183 paired subcaudals; cloacal scute divided.



Similar species

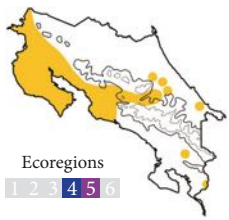
- *Imantodes gemmistratus* (p. 466) only barely overlaps in range; it differs in having enlarged middorsal scales that are only slightly wider than the lateral scales.
- *Imantodes inornatus* (p. 468) is similar in morphology but lacks the dorsal saddle blotches.
- *Leptodeira septentrionalis* (p. 476) and *Leptodeira rhombifera* (p. 472) are more robust and have more than 15 dorsal scale rows.
- *Sibon* species (pp. 502–515) are smaller and lack an extremely expanded middorsal scale row; their dorsal pattern often extends onto the venter.
- *Dipsas* species (pp. 434–437) have alternating black and light rings that completely encircle the body.

Imantodes gemmistratus

Least concern

Banded Blunt-headed Vine Snake (*Dormilona de Bandas*)

Extremely slender, with a compressed body, a proportionally big blunt head, and very large eyes. Has a row of moderately enlarged middorsal scales, 1.5–2.5 times wider than adjoining scales, and a dorsal color pattern of large, dark saddle-like markings. To 36.6 in (93 cm) in total length.



Imantodes gemmistratus occurs on the Pacific slope, from southern Mexico to southern Colombia; it also occurs locally on the Atlantic slope, in northern Guatemala, Honduras, and Costa Rica; from near sea level to 4700 ft (1435 m).

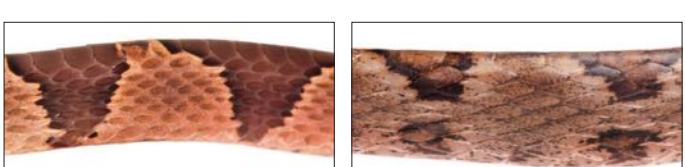
Natural history

Imantodes gemmistratus is a common species of dry forests and scrublands. It is adaptable and occurs near human habitations if adequate vegetation and ample lizard prey is available; it is regularly seen in gardens. Like its close relative *Imantodes cenchoa*, this species is a nocturnal hunter of sleeping anole lizards, and sometimes frogs. Prey is snatched from its perch after the snake extends its exceedingly thin body a very impressive distance from a nearby branch. Specially adapted vertebrae and well-developed trunk muscles enable these highly arboreal snakes to move with great ease through dense tangles and climb out onto the thinnest of twigs, using their long, prehensile tail as an anchor.

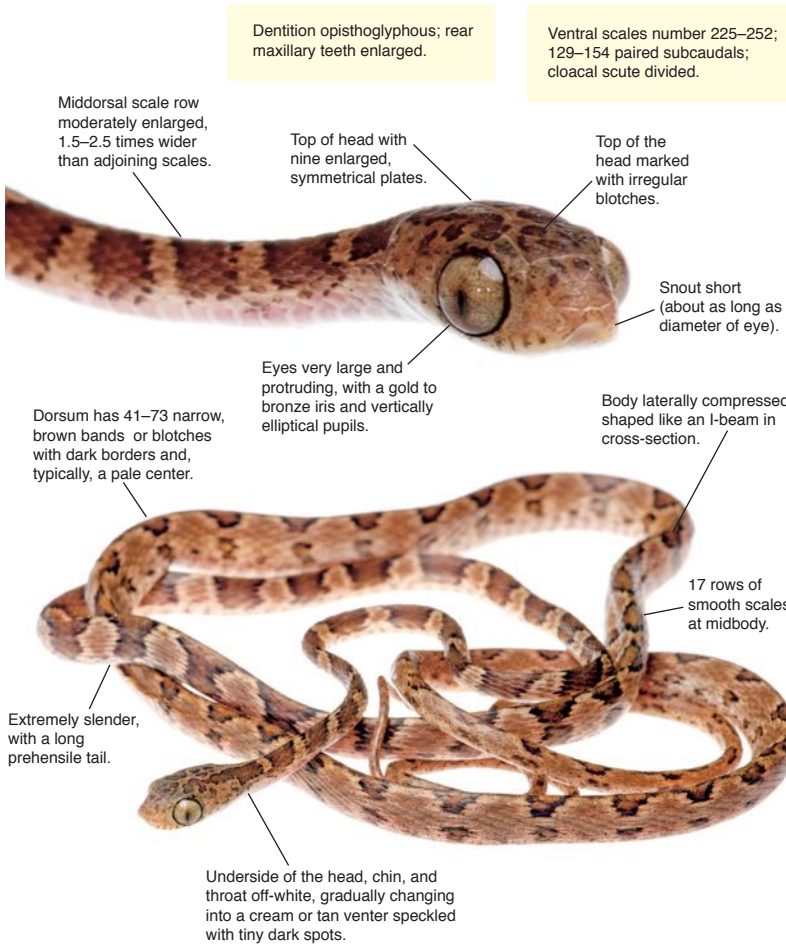
Imantodes cenchoa and *Imantodes gemmistratus* are quite similar in morphology and behavior and may co-occur locally, but in general the two are ecologically and geographically separated. *Imantodes gemmistratus* is more commonly seen in the deciduous dry forests along the Pacific slope of Costa Rica, although it apparently also occurs locally in moist lowland forest in the Atlantic lowlands of Costa Rica and Panama. It seems to prefer relatively open situations, more so than *Imantodes cenchoa*, which is generally found in the forest interior. It is not always easy to distinguish between these two species in the field, and the taxonomic status of both has long been a subject of debate. Apart from the most obvious difference—the degree to which their middorsal scales are enlarged—*Imantodes gemmistratus* usually has more dorsal markings than does *Imantodes cenchoa.* The latter species tends to have 31–48 wide, uniformly dark dorsal blotches, whereas *Imantodes gemmistratus* generally has a higher number of narrow bands or blotches, which almost always have a pale center.

Imantodes species have enlarged, grooved rear fangs that deliver a mild venom to quickly paralyze their prey. However, they are entirely inoffensive and harmless to humans.

Description



The two banded *Imantodes* species in Costa Rica can be difficult to distinguish in the field. Note how the middorsal scale row in *Imantodes cenchoa* (left) is several times wider than the adjacent scale rows, whereas in *Imantodes gemmistratus* (right) the middorsal scale row is only slightly wider than its neigboring scales. The dark blotches in *Imantodes gemmistratus* tend to have a pale center.



Similar species

- *Imantodes cenchoa* (p. 464) overlaps only slightly in range; it differs in having more widely expanded middorsal scales that are 3–5 times as wide as its lateral scales.
- *Imantodes inornatus* (p. 468) is similar in morphology but lacks the dorsal saddle blotches.
- *Leptodeira septentrionalis* (p. 476) and *Leptodeira rhombifera* (p. 472) are more robust and have more than 15 dorsal scale rows.
- *Sibon* species (pp. 502–515) are smaller, lack an extremely expanded middorsal scale row, and often have a dorsal pattern that extends onto the venter.
- *Dipsas* species (pp. 434–437) have alternating black and light rings that completely encircle the body.

Imantodes inornatus

Least concern

Yellow Blunt-headed Vine Snake (*Dormilona Salpicada*)

Exceedingly slender, with a compressed body, a blunt head, and large protruding eyes. Middorsal scale row only moderately enlarged (no more than 1.5 times wider than adjoining scales). Tan to golden yellow, with numerous tiny black specks. Total length to 40.9 in (104 cm).

Imantodes inornatus has a disjunct distribution from northwestern Honduras to northwestern Ecuador, on both slopes; from near sea level to 5250 ft (1600 m).

Natural history

Imantodes inornatus inhabits dense evergreen forests, where it can be seen climbing on low vegetation at night. Unlike the other two Costa Rican *Imantodes*, this species primarily feeds on frogs and their eggs, although it will also occasionally take small lizards. It appears to be somewhat less common than the other two *Imantodes* species, but does occur in greater numbers in lowland swamps and near wetland areas where large breeding congregations of tree frogs occur.

This species has enlarged, grooved rear fangs that are used to administer a mild venom that quickly paralyzes its prey. The exceedingly slender morphology of these snakes enables them to reach even the farthest, thinnest twigs of tree crowns and bushes, but it is not conducive to physically overpowering or immobilizing struggling frogs or lizards. Once the venom has incapacitated its prey, the snake will swallow it whole even though the food item may be several times the width of its neck, an impressive feat to observe. Despite the effects of its venom on frogs and lizards, *Imantodes inornatus* is entirely harmless to humans.

It has been suggested that *Imantodes inornatus* is a mimic of the yellow color phase of the arboreal pitviper *Bothriechis schlegelii* (know as *oropel*). When threatened, *Imantodes inornatus* will coil its body into several S-shaped coils, flatten its head, and spread its jaws. The resulting triangular head shape does resemble that of the arboreal pitvipers in the genus *Bothriechis*, and yellow forms of *Bothriechis schlegelii* co-occur with *Imantodes inornatus*, lending credibility to the notion that the latter species might benefit from resembling a dangerously venomous species. Interestingly, *Imantodes cenchoa* and *Imantodes gemmistratus* do not display this defensive behavior.

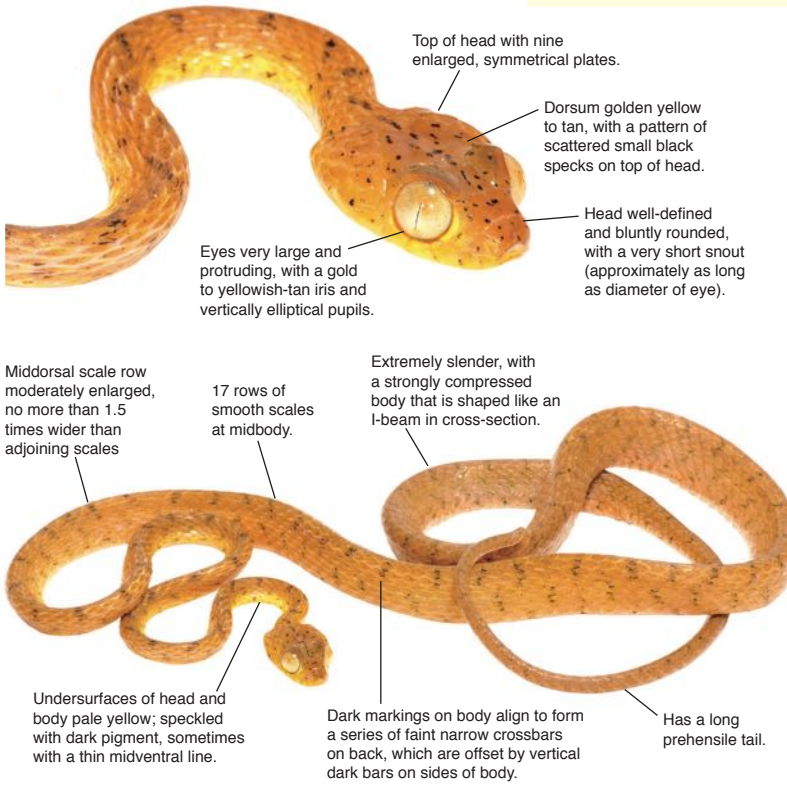
Imantodes inornatus is oviparous and reportedly produces clutches of up to six eggs; reproduction seems to take place over a protracted period (April through August) and may occur year-round.

Imantodes inornatus uses its huge eyes and keen chemosensory abilities to locate prey at night.

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 196–218; 110–132 paired subcaudals; cloacal scute usually divided.



Similar species

- No other arboreal, compressed-bodied, blunt-headed snake with a more or less uniform tan to yellow coloration occurs in Costa Rica.
- Other species of *Imantodes* (pp. 464–469) have distinct saddle-shaped dorsal blotches.

Leptodeira nigrofasciata

Least concern

Banded Cat-eyed Snake (*Ojos de Gato Bandeada*)

Small to medium-sized, with a cylindrical body and vertically elliptical pupils. Has a cream to dirty white ground color, marked with 10–21 chocolate-brown to black saddles that extend across the entire dorsum and onto the edges of the ventral scales, but do not completely encircle the body. Total length to 22.8 in (58 cm) in females, and to 19.3 in (49 cm) in males.

Leptodeira nigrofasciata occurs along the Pacific slope, from Guerrero, Mexico, to Costa Rica, and locally on the Atlantic slope in Honduras and Guatemala; from near sea level to 4265 ft (1300 m).

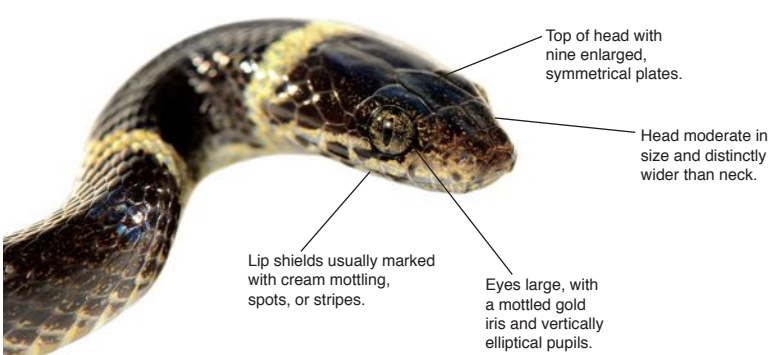
Natural history

Leptodeira nigrofasciata is a fairly common species most often found in dry forest and savanna, but it also marginally enters humid lowland and premontane forest habitats. This species is adaptable and regularly found in buildings or seen crossing roads at night. It is nocturnal and terrestrial, although individuals have been seen climbing trees and discovered in tree holes several yards above the ground during the day.

This is a poorly known species that reportedly feeds on frogs and smooth-scaled lizards such as skinks and gymnophthalmids. Prey is killed with a mild venom that is administered through enlarged rear fangs. Bites by *Leptodeira* species can cause pain and localized swelling in humans, although most individuals are relatively docile and reluctant to bite.

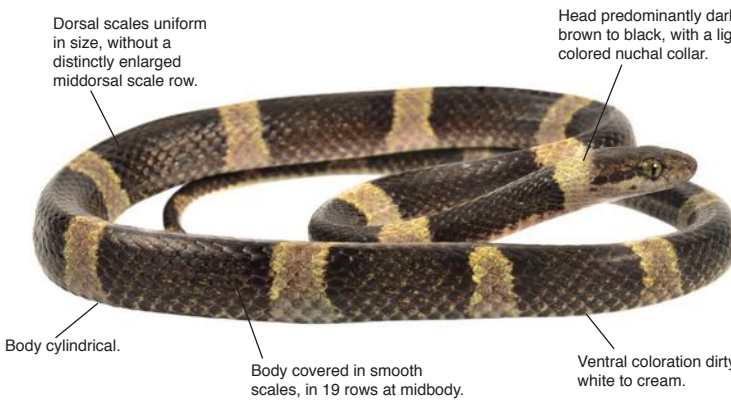
Leptodeira nigrofasciata is oviparous, with clutches of up to six eggs reported.

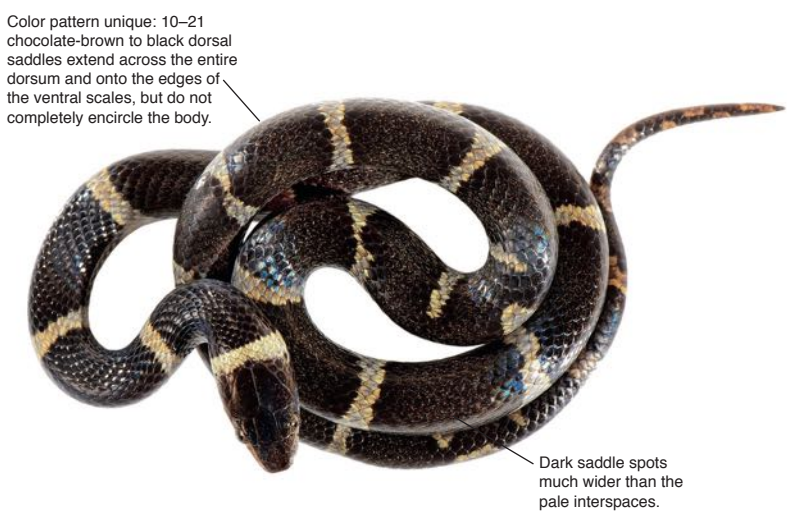
Description



Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 168–186; 50–75 paired subcaudals; cloacal scute divided.





Similar species

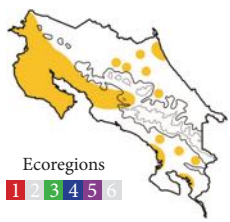
- *Tropidodipsas sartorii* (p. 529) has a short, bluntly rounded head and dark and light rings that completely encircle the body.
- Juvenile *Pliocercus euryzonus* (p. 490) have an exceedingly long tail, round pupils, and a black iris.
- Juvenile *Oxyrhopus petola* (p. 488) have cream and black bands that do not completely encircle the body; in older individuals, orange pigment suffuses into the light bands.
- *Sibon anthracops* (p. 504) has bright orange blotches in each light body ring.

Leptodeira rhombifera

Least concern

Common Cat-eyed Snake (*Ojos de Gato Común*)

A common, brown snake with a slightly compressed body, a broad head with bulging eyes and vertically elliptical pupils, a dorsal pattern of irregular dark blotches with pale centers, and a white venter. Dark, median nape stripe, if present, generally connects with the first dorsal dark blotch. Total length to 40.9 in (104 cm) in females, and 35.8 in (91 cm) in males.



Leptodeira rhombifera occurs in Mexico, throughout Central America, and in much of South America, including several Caribbean Islands. In Costa Rica, it occurs in the lowlands and foothills along both slopes, but it is most common in the Pacific northwest and the western Central Valley; from near sea level to 4595 ft (1400 m).

Natural history

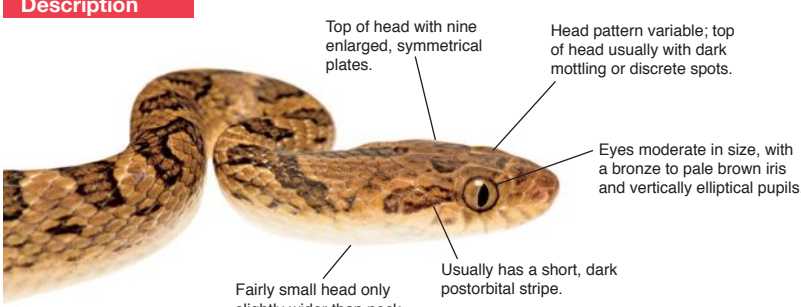
Leptodeira rhombifera is a common and widespread snake. Even though it occurs in a wide variety of habitats, it is most common in seasonally dry areas; it is infrequently encountered in more humid environments. It feeds predominantly on frogs and toads; during the early rainy season, when amphibians commence breeding, these snakes can be quite common around any body of water that contains tadpoles.

Leptodeira rhombifera is a terrestrial species that hides under cover objects, rocks, and logs during the day and cruises the banks of ponds and streams at night, in search of its amphibian prey. These snakes readily swim if they need to and are also known to climb into low vegetation. Smaller prey such as tadpoles and small amphibian metamorphs are swallowed whole, but larger individuals are held in the mouth and chewed until the mild venom paralyzes the prey. Although generally reluctant to bite, the venom of *Leptodeira rhombifera* can cause pain and local swelling in humans.

This species is oviparous; clutches of up to 10 eggs have been reported. Eggs have been recorded during the drier months (December–March) and take about three months to hatch. Hatchlings are generally present when amphibian breeding is in full swing and many small froglets and tadpoles are available.

This species was previously considered to be a subspecies of *Leptodeira annulata*: *Leptodeira annulata rhombifera*. It was recently elevated to full species status, but is still listed as *Leptodeira annulata* in older literature.

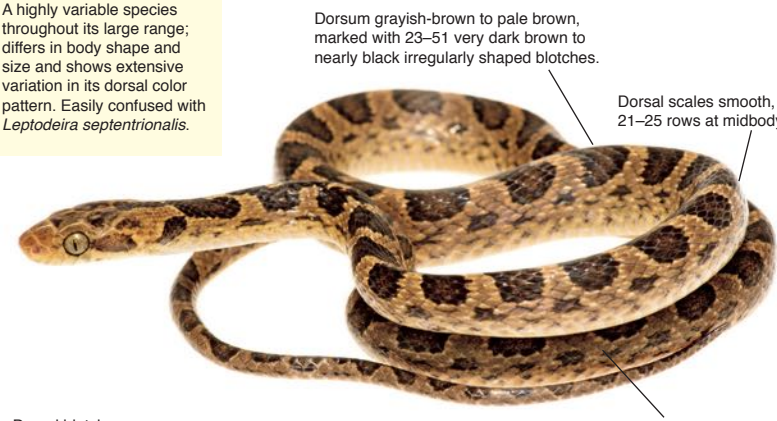
Description

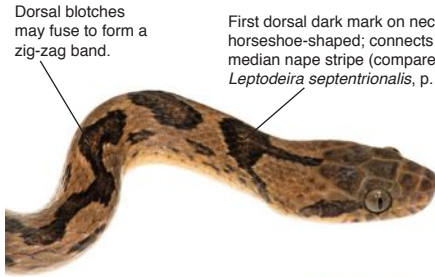


Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 151–181; 59–89 paired subcaudals; cloacal scute divided.

A highly variable species throughout its large range; differs in body shape and size and shows extensive variation in its dorsal color pattern. Easily confused with *Leptodeira septentrionalis*.





Hatchlings and very small juveniles have a cream nuchal collar that disappears with age.

Similar species

- *Leptodeira septentrionalis* (p. 476) is very similar in appearance. It is arboreal, more slender, longer-tailed, and lacks a dark neck band that extends as a longitudinal stripe onto the head.
- *Drymobius rhombifer* (p. 355) has round pupils and keeled dorsal scales.
- *Leptodeira rubricata* (p. 474) is a mangrove specialist with a red ground color.

Leptodeira rubricata

Least concern

Mangrove Cat-eyed Snake (*Ojos de Gato de Manglar*)

Moderate-sized and slender, with a cylindrical body, large eyes, and vertically elliptical pupils. Head, body, and tail red, with a pattern of 57–67 dark dorsal blotches. Total length to 29.5 in (75 cm).

Leptodeira rubricata is restricted to mangrove forest on the Pacific, from the mouth of the Tarcoles River, Costa Rica, southward to extreme western Panama; from sea level to 15 ft (5 m).

Natural history

Leptodeira rubricata only occurs in mangrove forest along the Pacific coast of Costa Rica (and in Panama). It can be fairly common in the few areas where it is known to occur but is rarely observed because few observers enter its specific microhabitat. Little is known about the biology of this species. *Leptodeira rubricata* appears to be mostly terrestrial or semi-aquatic, although individuals are known to climb as well. It is primarily nocturnal and preys on small crabs and fish.

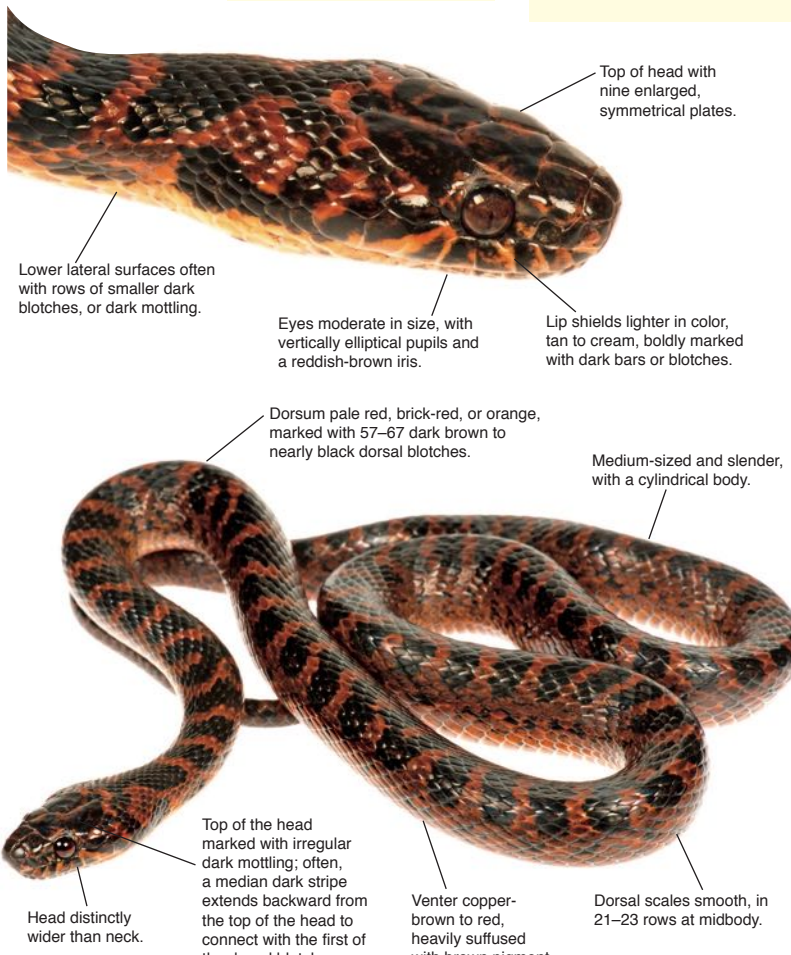
Leptodeira rubricata is oviparous; it produces clutches of up to six eggs are during the dry season.

Leptodeira rubricata is rarely seen because of its unusual habitat preference.

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 177–182; 82–97 paired subcaudals; cloacal scute divided.



Similar species

- *Leptodeira rhombifera* (p. 472) does not have a red dorsum and venter and has fewer (23–51) dorsal dark blotches.
- *Leptodeira septentrionalis* (p. 476) is arboreal, more slender, longer-tailed, and lacks a dark neck band that extends as a longitudinal stripe onto the head.
- *Stenorrhina freminvillii* (p. 398) sometimes has a red dorsum but lacks the dorsal dark blotches.

Leptodeira septentrionalis

Least concern

Northern Cat-eyed Snake (*Ojos de Gato Norteña*)

A very common, pale brown snake. Has a slightly compressed body, a broad head with bulging eyes and vertically elliptical pupils, a pattern of dark dorsal blotches, and a light-colored venter. If a dark median nape stripe is present, it generally does not connect with the first dorsal dark blotch. Total length to 39.4 in (100 cm) in adult females and slightly less in males.

Leptodeira septentrionalis is very widespread, ranging from from southern Texas to Peru. In Costa Rica, it occurs on both slopes, from near sea level to 6070 ft (1850 m).

Natural history

This may be one of the most abundant snakes in Costa Rica. It is nocturnal and arboreal, and is commonly seen climbing the vegetation surrounding any marsh, pond, or river that harbors a thriving amphibian population. Frogs and toads are its preferred prey, but it also eats their eggs and tadpoles, as well as sleeping anoles. *Leptodeira septentrionalis* famously eats the eggs of red-eyed leaf frogs (*Agalychnis callidryas*), hourglass tree frogs (*Dendropsophus ebraccatus*), and other frogs that deposit their eggs out of the water, attached to plants that overhang a breeding pool. During peak amphibian breeding season, it is not uncommon to see multiple *Leptodeira septentrionalis* hunting and feeding in a single tree or bush.

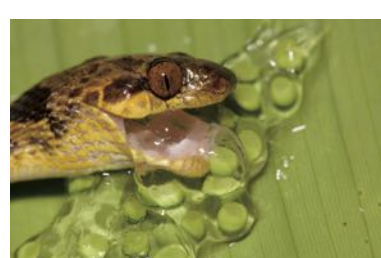
Despite its slender body, *Leptodeira septentrionalis* also feeds on relatively large frogs, which it seizes with a quick strike and holds in its mouth while chewing venom into the bite wounds. Frogs succumb rapidly and are swallowed once they are paralyzed. The venom can cause local pain and swellings in humans, but these docile snakes are unlikely to bite. Individual *Leptodeira septentrionalis* have also been observed feeding on squashed frogs and toads on roads.

A novel feeding strategy was recently documented for this species. A small individual had captured and bitten into an adult masked tree frog (*Smilisca phaeota*), which had inflated its body in defense. Unable to subdue and swallow such a large prey, the snake bit the frog's neck and held on for two hours, all the while chewing venom into the prey's body. Once paralyzed, the snake pushed its head into the gash it created in the frog's neck and started eating its internal organs. Despite the limited gape size in the snake, this feeding strategy still enabled it to consume part of its prey.

When threatened, *Leptodeira septentrionalis* may flatten its head and spread its jaws, creating a somewhat viperlike triangular head shape.

Leptodeira septentrionalis is oviparous and lays clutches of 6–13 eggs. A captive solitary female produced clutches of fertilized eggs at irregular intervals up to 4 years after having had an opportunity to mate. This suggests that it is capable of long-term sperm storage and delayed fertilization.

This is a confusing snake that will likely be split into several cryptic species. The names *Leptodeira polysticta* and *Leptodeira ornata* have been applied to various Costa Rican populations, but until more information is available *Leptodeira septentrionalis* remains most pertinent.

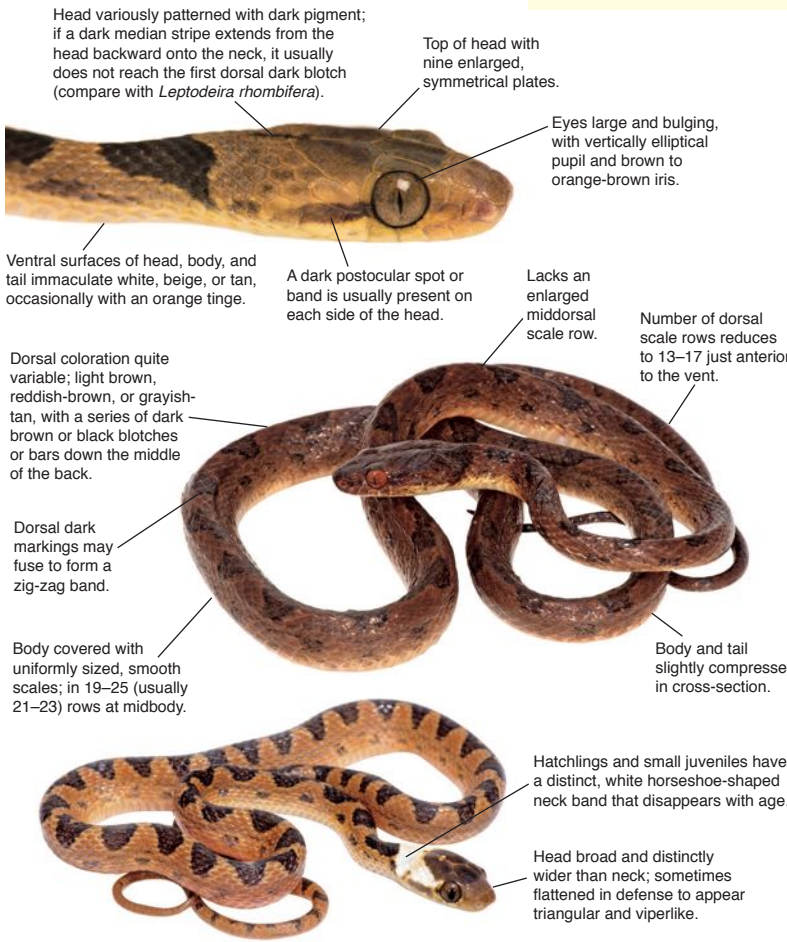


Leptodeira septentrionalis is commonly seen during periods of amphibian breeding; it readily feeds on the eggs of leaf-breeding frogs such as the red-eyed leaf frog (*Agalychnis callidryas*).

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 186–211; 73–107 paired subcaudals; cloacal scute divided.



Similar species

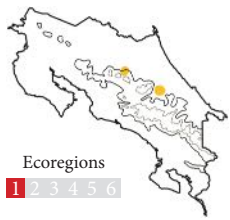
- *Leptodeira rhombifera* (p. 472) is stockier and more terrestrial; it generally has a dark longitudinal stripe on the top of its head that connects with the first dorsal blotch on the neck.
- *Leptodeira rubricata* (p. 474) is a mangrove specialist with a red ground color.
- *Imantodes cenchoa* (p. 464) has an exceedingly skinny body and a blunt head that is much wider than its neck; its middorsal scale row is conspicuously enlarged, 3–5 times as wide as adjoining scale rows.
- *Imantodes gemmistratus* (p. 466) also has a skinny body and blunt head that is much wider than its neck; its middorsal scale row is 1.5–2.5 times as wide as adjoining scale rows.
- *Drymobius rhombifer* (p. 455) is terrestrial and has round pupils.

Ninia celata

Least concern

Costa Rican Coffee Snake (*Culebra de Café Costarricense*)

A small, blunt-headed fossorial snake with strongly keeled dorsal scales arranged in 19 rows at midbody; it has a uniform black head, dorsum, and tail, and a uniform white venter (juveniles have a pale nuchal collar). Total length to 17.7 in (45 cm).



Ninia celata occurs in disjunct populations on the Atlantic slope of the Central Mountain Range, Guayacán de Siquirres area in Limón Province, and in western Panama; 2460–4460 ft (750–1360 m).

Natural history

This small, secretive snake is generally found hiding beneath surface debris during the day. At night it may be encountered active on the forest floor, but since it is usually hidden in leaf litter, or even underground in insect burrows, it is not often seen. It inhabits premontane rainforests and cloud forests.

Ninia celata is a docile snake that most likely feeds on worms and other soft-bodied prey. Individuals never attempt to bite but may twitch their body nervously when captured. These snakes sometimes flatten their body as a defensive strategy, presumably to appear larger.

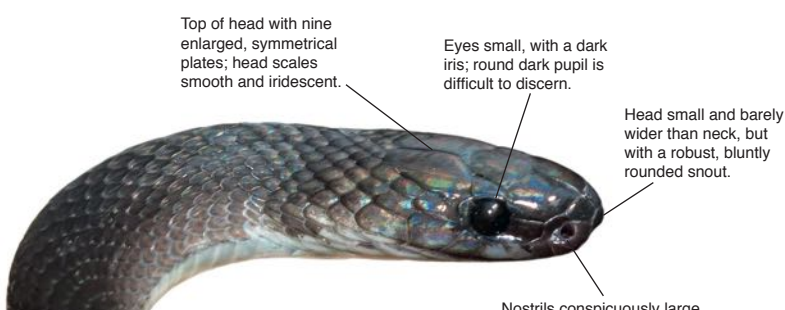
Ninia celata is oviparous; a clutch of two eggs has been reported.

Older literature may refer to this species as *Ninia atrata*, a related species that is now thought to be restricted to eastern Panama and northern South America.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales 123–130; 33–45 paired subcaudals; cloacal scute undivided.



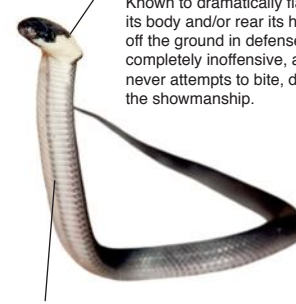
Upper surfaces of head, body, and tail uniform dark gray to black.

Small and relatively robust, with a long tail.

Dorsal scales strongly keeled, in 19 rows at midbody.

Juveniles with a bold light-colored band across the neck and back of the head; band darkens and disappears with age.

Some adults have white markings on some of the posterior lip scales, a remnant of the white nuchal band that is present in juveniles.



Known to dramatically flatten its body and/or rear its head off the ground in defense; completely inoffensive, and never attempts to bite, despite the showmanship.

Ventral surfaces uniform white to cream. Some populations have a gray midventral stripe.

Similar species

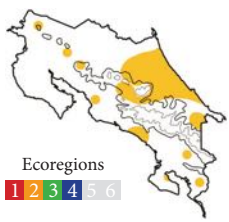
- *Ninia psephota* (p. 482) is most similar but generally has light-colored, narrow crossbands on the dorsum and a dark checkerboard pattern on its venter.
- *Geophis* species (pp. 448–461) have a bullet-shaped head with reduced head scales; most do not have all their dorsal scales keeled.
- *Enulius flavitorques* (p. 440) has smooth scales and a long tail.

Ninia maculata

Least concern

Banded Coffee Snake (*Culebra de Café Bandeada*)

Small, with a bluntly rounded snout, fairly small eyes, and consicuously keeled dorsal scales. Dorsal coloration highly variable, reddish-brown to dark gray, with alternating black spots or bars on either side of the body, and a broad, black band across the neck. Venter with bold black and white blotches. Tends to flatten its body in defense. Total length to 15.7 in (40 cm).



Ninia maculata occurs on the Atlantic slope, from eastern Honduras to eastern Panama; it occurs on the Pacific slope of Costa Rica and in the Central Valley. It is also found locally on the Pacific slope of Panama. From near sea level to 5740 ft (1750 m).

Natural history

This is a small, extremely variable snake. It is commonly found in a variety of habitats; although it can occur in pristine rainforests, it is far more often encountered in disturbed habitats, regenerating forests, plantations, and gardens.

Ninia maculata is generally crepuscular or nocturnal. After dark, it can be spotted on the forest floor or in leaf litter. More often, individuals are uncovered inadvertently when removing surface debris under which they hide. These small, harmless snakes feed on earthworms, slugs, invertebrate larvae, and other soft-bodied prey.

This is an oviparous species, and clutch sizes of up to five eggs have been reported. Hatchlings appear throughout the year in the wetter habitats of the Atlantic slope. On the Pacific slope, however, where seasonality is far more pronounced, hatchlings are mostly observed during the dry season and early rainy season.

Ninia maculata displays a remarkable defensive behavior; if disturbed, it spreads its ribs and flattens its body while remaining completely rigid and motionless. The flattening of the body is sometimes so extreme that there is seemingly no room for its internal organs. When defending themselves, these snakes deploy other ways of contorting their body and remaining rigid in seemingly unnatural positions and may even feign death by sticking out their tongue and staying motionless.

There is considerable color and pattern variation in this species. Generally, Atlantic slope populations appear to be gray with a pattern of black crossbands and blotches, whereas individuals from the highlands and Pacific slope populations tend to be brown to reddish-brown in coloration. with an irregular pattern of dark saddle spots or narrow bars on the body and a yellowish-tan neck band that extends onto the back of the head. Historically, these color varieties have been considered distinct species, but the various morphs interbreed and the current consensus is that they represent geographic variations of a single, polymorphic species.

Ninia maculata often contorts itself into bizarre positions or flattens its body to an extreme degree to defend itself.

Description

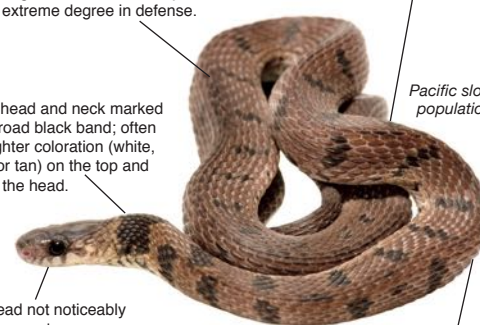
Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 125–155; 44–63 paired subcaudals; cloacal scute undivided.

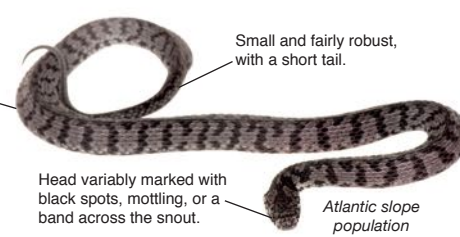
Juveniles with bright red to reddish-brown dorsal coloration, and a pattern of narrow black bars on both sides of the dorsum that gradually fades out; tail usually uniformly colored. Some individuals retain the juvenile pattern into adulthood.

Venter white or cream. with bold black markings on each ventral and subcaudal scale; black spots often align to form a checkerboard pattern, or one or two longitudinal black stripes.

Body triangular in cross-section, with a slight middorsal ridge; can flatten its body to an extreme degree in defense.



Coloration highly variable. Dorsum tan, reddish-brown, brown, or dark gray, with alternating, black squarish spots on either side of the body; sometimes with black saddle spots on the dorsal midline. Black spots may be bordered by lighter coloration (tan, cream).



Similar species

- *Ninia sebae* (p. 484) may resemble Pacific slope populations of *Ninia maculata* that have reddish-brown in their coloration, but it never has a bold black-and-white checkerboard pattern on its venter.
- *Ninia psephota* (p. 482) has a dark dorsum with series of light, narrow crossbars.
- *Ninia celata* (p. 478) has a uniform dark dorsum and a uniform white venter.
- *Sibon nebulatus* (p. 514) has smooth scales and a long, prehensile tail.

Ninia psephota

Least concern

Checkered Coffee Snake (*Culebra de Café Cuadriculada*)

Small to medium-sized, with a bluntly rounded snout, small dark eyes, and conspicuously keeled dorsal scales. Dorsal coloration nearly uniform dark or marked with thin light-colored bands on each side of the body; venter white, cream, or yellow, boldly checkered with black. Total length to 21.6 in (55 cm).

Ninia psephota occurs at middle elevations in the Guanacaste, Tilarán, Central, and Talamanca mountain ranges of Costa Rica; it also occurs in adjacent western Panama. From 3935–9105 ft (1200–2775 m).

Natural history

A secretive crepuscular or nocturnal snake, most often found hiding beneath logs, boards, rocks, or other surface debris during the day. This is a species of relatively cool middle elevation and montane forests; it occurs in moderately altered habitats such as forest clearings, cultivated land, and pastures, as long as sufficient forest cover is available nearby. In areas where suitable cover objects are scarce, these snakes may congregate with members of their own species, as well as other snake species, in ideal basking spots. A woodpile in the Las Tablas region contained three *Ninia psephota*, two *Geophis talamancae*, and a *Geophis godmani*, as well as several green spiny lizards (*Sceloporus malachiticus*).

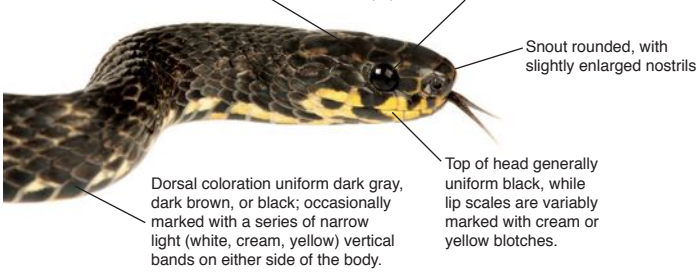
At night, *Ninia psephota* explores leaf litter on the forest floor or enters underground insect burrows; it is therefore not often seen. These harmless, docile snakes mostly feed on soft-bodied prey such as worms, slugs, and insect larvae. However, a Panamanian individual was found to contain numerous beetles in its stomach.

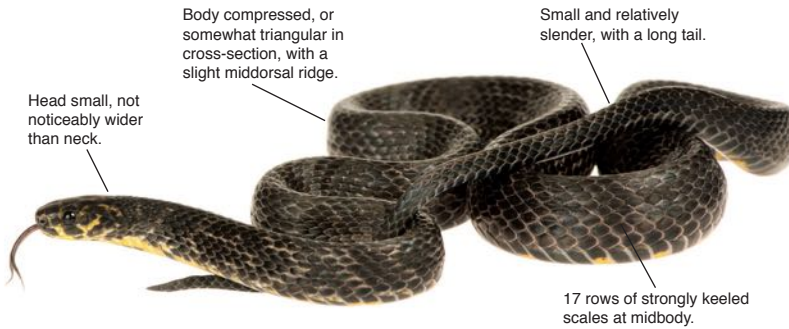
Ninia psephota is oviparous; clutches of up to three eggs have been reported in August. Gravid females were observed in March.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 149–163; 60–77 paired subcaudals; cloacal scute undivided.





A pale nuchal collar is often present in juveniles but fades with age.

Ventral coloration white, cream, or yellow, with bold, black bars of varying length on each ventral scale.

While many *Ninia psephota* may appear nearly solid black, some individuals are marked with a series of narrow light (white, cream, yellow) vertical bands on either side of the body, creating a banded or reticulated pattern.

Similar species

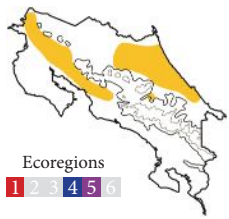
- *Ninia celata* (p. 478) has a solid dark dorsum and a uniform white venter.
- *Ninia maculata* (p. 480) has a brown, reddish-brown, or gray dorsum, with a pattern of dark crossbars.

Ninia sebae

Red Coffee Snake (*Culebra de Café Rojiza*)

Least concern

Small, with a bluntly rounded snout, small dark eyes, and consicuously keeled dorsal scales. Dorsum red; head and anterior portion of neck yellow, marked with a black head cap and a large black saddle spot on the neck. Venter white or cream. Total length to 15.8 in (40 cm).



Ninia sebae occurs on the Atlantic and Pacific slopes, from Mexico to Costa Rica; from near sea level to 3610 ft (1100 m).

Natural history

A very common small snake of open country, plantations, and cultivated areas; it also enters into forested areas, at low and middle elevations. *Ninia sebae* is terrestrial and fossorial; it is often found underneath logs, boards, leaf piles, and other cover objects. This may be one of the few snake species that benefits from the removal of humid Atlantic lowland forests to accommodate agriculture; the resulting open habitat, with scattered mounds of vegetation and downed logs, is preferred by this species.

It hides during the day, but at night it hunts for worms, slugs, and other invertebrates, either on the surface or while moving through insect burrows. One individual reportedly consumed a small caecilian. In lowland areas, these small snakes cross roads between agricultural areas at night and are regularly killed by passing traffic.

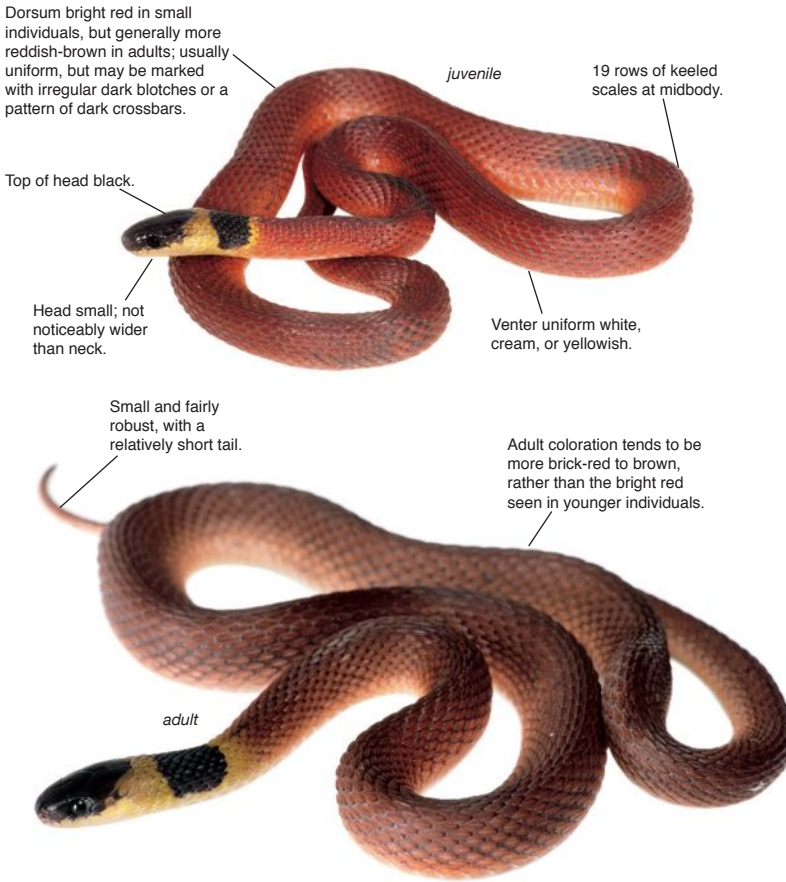
These harmless snakes may twitch their body in an erratic fashion when handled, but never attempt to bite. Like other *Ninia* species, they can flatten their body and raise up their head in a defensive stance.

Ninia sebae is oviparous and produces clutches of 1–4 eggs. Reproduction is likely seasonal in areas with a pronounced dry season; eggs have been reported during the rainy season. There is some indication that multiple females may use a communal nest site to lay their eggs in.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 132–148; 51–66 paired subcaudals; cloacal scute undivided.



Similar species

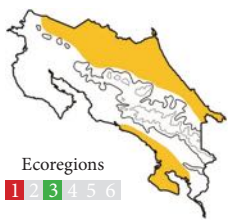
- Some populations of *Ninia maculata* (p. 480) have a reddish-brown dorsum, but these snakes never have a uniform white belly and a black head cap that includes the parietal scales.
- Juvenile *Clelia clelia* (p. 420) and *Clelia scytalina* (p. 422) share a very similar color pattern but have smooth scales.

Nothopsis rugosus

Rugose Swamp Snake (*Culebra Granosa*)

Least concern

An unusual looking, very thin snake with a long tail. Has numerous small, keeled scales on the top of its head, a high number of heavily keeled dorsal scale rows (26–28), and vertical pupils. Although somewhat viperlike in appearance, it can be distinguished by the lack of heat-sensitive loreal pits. Total length to 17.7 in (45 cm).



Nothopsis rugosus occurs in scattered localities from eastern Honduras to Panama on the Atlantic slope, and from southwestern Costa Rica to Colombia and Ecuador on the Pacific slope; from near sea level to 3280 ft (1000 m).

Natural history

A unique monotypic genus of small rainforest snakes. The only species in its genus, *Nothopsis rugosus* is immediately distinguished from all other Costa Rican snakes in the Colubridae, Dipsadidae, and Natricidae families by having numerous small, keeled scales on the top of the head instead of the typical nine-plate configuration seen in most members of those families.

Nothopsis rugosus is an enigma among Costa Rican snakes. Everything about its morphology, its extremely slender body, large number of scale rows, and fragmented head scales, is unique.

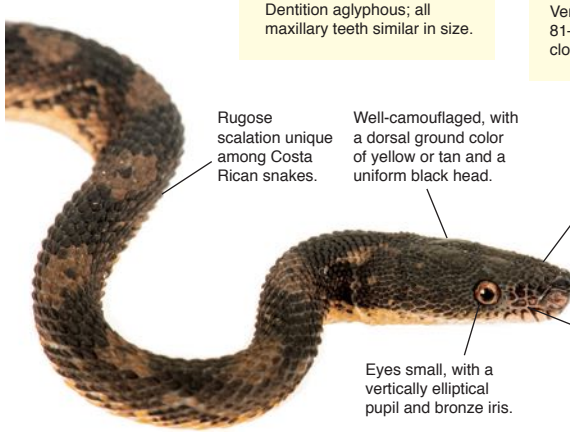
This is a rare and enigmatic snake of pristine rainforest habitat in lowlands and foothills. Limited observations suggest that it is nocturnal and terrestrial, and that it inhabits leaf litter on the forest floor, often near streams or rivers. Analysis of its stomach contents has shown that *Nothopsis rugosus* feeds on salamanders, frogs, and small terrestrial lizards. When threatened, some individuals feign death and remain motionless, while others hold their body rigid, apparently to blend in with their surroundings.

Nothopsis rugosus is oviparous and lays 1 or 2 eggs at a time.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 152–162; 81–112 paired subcaudals; cloacal scute undivided.



Juvenile *Nothopsis rugosus* have a much more contrasting color pattern than do adults, with a distinct separation between the black head and tan body.

Similar species

- Pitvipers also lack enlarged head scales, but invariably have a heat-sensitive loreal pit on each side of the snout.

Oxyrhopus petola

Halloween Snake (*Gargantilla Falsa*)

Least concern

A medium-sized snake with a unique color pattern of alternating black and light (orange in adults, cream in juveniles) bands on its body and tail, combined with a uniform cream to white venter. Body slighty compressed; covered with 19 rows of evenly sized smooth dorsal scales. Total length to 47.2 in (128 cm).

Oxyrhopus petola ranges from southern Mexico to Bolivia and northern Brazil. Costa Rican populations occur continuously along the Atlantic slope and in isolated locations in the Pacific southwest; from near sea level to 4375 ft (1334 m).

Natural history

Oxyrhopus petola is a spectacularly colored nocturnal snake. It is relatively uncommon, but is perhaps underreported because of its preference for forest interiors, where observers are few. This is an essentially terrestrial snake that sometimes climbs into low vegetation in search of prey. It feeds mainly on lizards and snakes but is also know to eat frogs and small mammals. Prey is immobilized and killed by a mild venom that is delivered through enlarged rear fangs, but these snakes may also use constriction to disable struggling prey. *Oxyrhopus petola* tends to be rather docile when captured and rarely attempts to bite.

Juvenile *Oxyrhopus petola* start out looking quite different from adults; they lack bright orange coloration but have a cream or pale-yellow dorsum marked with black bands. As the snake grows, orange color marks form in the centers of each light-colored band and gradually increase in size. Subadults with an intermediate color pattern may appear temporarily tricolored, with the orange band bordered by pale yellow on both sides, thus creating a coralsnake-like pattern. Eventually all lighter coloration is replaced by bright orange in Costa Rican individuals. In populations in other parts of its range, most notably in northern Central America, adult *Oxyrhopus petola* have a pattern of alternating orange and black bands on the body and tail but retain a distinct black-bordered yellowish band in the neck.

Oxyrhopus petola is oviparous and clutches of 5–10 eggs have been reported, although the clutch size in Costa Rican populations may be on the lower end of that range (6 or 7 eggs per clutch have been reported, but only limited data exists).

Some sources list this species as *Oxyrhopus petolarius*; there is a long-standing controversy over which name is correct.

Description

In juveniles, dorsal color is cream to pale yellow instead of orange; color changes with age. Animals with a transitional pattern may appear tricolored and resemble coralsnakes, with the orange bands bordered on either side by a yellowish-cream band.

juvenile

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 192–244; 79–117 paired subcaudals; cloacal scute undivided.

Similar species

- *Pliocercus euryzonus* (p. 490) is patterned with a series of black and cream rings that completely encircle the body and tail; in most adults, the cream rings are suffused above with bright orange or red pigment.
- *Siphlophis compressus* (p. 516) has a light venter but has a greatly enlarged vertebral scale row and a solid red dorsal coloration.
- *Tropidodipsas sartorii* (p. 529) could be confused with juvenile *Oxyrhopus petola* but differs in that the colored rings completely encircle the body and tail; it also has a notably short-snouted, broad head.

Pliocercus euryzonus

Least concern

Ringed Glasstail (*Cola de Vidrio Anillada*)

Relatively robust and long-tailed (although tail often incomplete). Dorsal pattern glossy black, with a pattern of narrow, light-colored rings that completely encircle the body and tail. The rings are white or pinkish-orange in juveniles; on adults, the rings are white on the venter and orange-red on the dorsum. Total length to 33.5 in (85 cm).

Pliocercus euryzonus ranges from Guatemala to central Panama on the Atlantic slope; on the Pacific slope it occurs locally in northwestern and central Costa Rica, and continuously from central Panama into northern South America (western Colombia and Ecuador). From near sea level to 4920 ft (1500 m).

Natural history

A slender, very long-tailed terrestrial snake of forest interiors. It is most often seen during the day, in shaded understory habitat, or at dawn or dusk in more open settings along trails and in forest clearings (on occasion these snakes are also active after dark). *Pliocercus euryzonus* is generally found in wet forest types and is associated with forest streams. Its main prey is leaf-litter frogs (genus *Craugastor*) and other amphibians (one individual reportedly ate a salamander); this snake actively seeks out prey by probing the leaf litter layer on the forest floor.

Pliocercus euryzonus is oviparous; it produces clutches of up to six eggs. Although nothing is known about its reproductive biology, hatching of its eggs is likely synchronized with periods of increased amphibian reproduction to ensure adequate small prey for the young snakes.

The adult color pattern of alternating black and orange rings somewhat resembles that of the venomous bicolored coralsnake, *Micrurus multifasciatus*. *Pliocercus euryzonus* is therefore sometimes considered to be a coralsnake mimic. It is a completely harmless snake that deploys pseudoautotomy as its main antipredator strategy; its long fragile tail can break off sections when even lightly restrained. The severed section will continue to wriggle and, hopefully, distract the predator as the snake escapes. Unlike lizard tails, snake tails do not regenerate, and it is not uncommon to observe individual *Pliocercus euryzonus* with incomplete tails.

Taxonomic placement of this species has long been controversial; it has been assigned to either *Pliocercus* or *Urotheca*, and is still included in many publications as *Urotheca euryzona*.

Adults of this gorgeous snake are immediately recognized by the colorful bands on their body and tail. The bands are white below and orange on top.

Description

Head glossy black, with an orange band across the parietal scales.

Head slightly wider than neck; flattened and with an angular snout.

Eyes fairly large; pupil round and iris dark; eye is completely incorporated within the black head cap.

Chin and throat white; often a light-colored spot is present on the supralabial scales, below each nostril.

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 126–142; 90–122 paired subcaudals; cloacal scute divided.

Scales smooth and very shiny, arranged in 17 rows at midbody.

In adults, dorsal section of light rings is orange-red.

A medium-sized snake with a relatively robust, cylindrical body and a long tail that is often incomplete.

Top of head with nine enlarged, symmetrical plates.

Ventral surfaces marked with alternating black and white bands.

Juveniles have a dorsal pattern that consists of alternating broad black and narrow white or pinkish rings. In adults, the dorsal sections of the light-colored rings gradually become bright orange.

Similar species

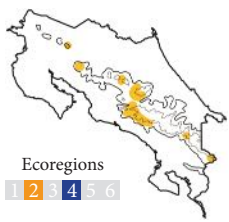
- *Oxyrophus petola* (p. 488) is most similar superficially but differs in having a uniformly white venter; its orange and black bands do not completely encircle the body and tail.
- *Micrurus multifasciata* (p. 557) is a venomous coralsnake with a very short tail and short, rounded head; the black head cap that covers the snout ends at its tiny black eyes (eyes completely incorporated in black head cap in *Pliocercus euryzonus*).
- *Tropidodipsas sartorii* (p. 529) somewhat resembles black-and-white juveniles, but has a short, bluntly-rounded head and shorter tail; its black head cap is V-shaped, not straight-edged.
- *Dipsas articulata* (p. 434) also somewhat resembles black-and-white juveniles, but is arboreal and has a distinctly compressed body, prehensile tail, and large eyes with vertically elliptical pupils.
- *Leptodeira nigrofasciata* (p. 470) has vertical pupils and a dark bronze iris.

Rhadinaea calligaster

Least concern

Spot-lipped Litter Snake (*Hojarasquera de Vientre Manchado*)

Small to medium-sized, with a robust, cylindrical body; eyes large, with round pupils. Dorsum yellowish-green to dark olive-green, with a pattern of dark longitudinal stripes; top of head uniformly colored. Presence of bold black margins on lip scales, combined with a central series of dark triangular or crescent-shaped markings on ventral scales, is diagnostic. Total length to 20.1 in (51 cm) in females, 17.3 in (44 cm) in males.



Rhadinaea calligaster occurs at middle and high elevations in the mountains of Costa Rica and extreme western Panama; 3935–8200 ft (1200–2500 m).

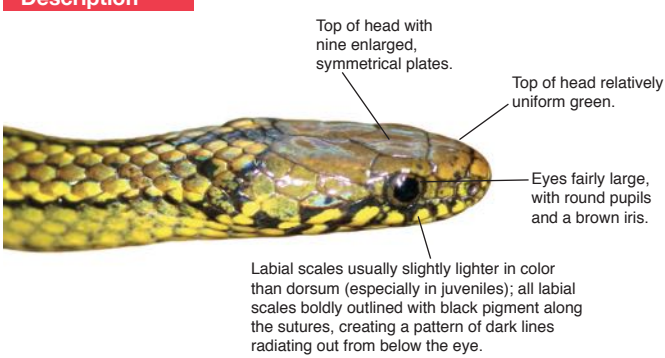
Natural history

A fairly common snake of montane regions. *Rhadinaea calligaster* is a day-active, terrestrial snake of cloud forest and oak forest habitats; it also enters disturbed habitats such as plantations and pastures. Like most high elevation reptiles, these snakes hide during suboptimal weather conditions and their surface activity may be limited for long periods of time. Although individuals are sometimes seen actively moving about the forest floor, they are often found under cover objects such as logs, boards, and rocks, or buried below layers of moss, piles of leaves, or flattened vegetation.

Rhadinaea calligaster is a harmless snake. Little is known about its biology. Presumably it feeds on amphibians or small lizards, like other species of *Rhadinaea*. It is possible that juveniles eat invertebrates.

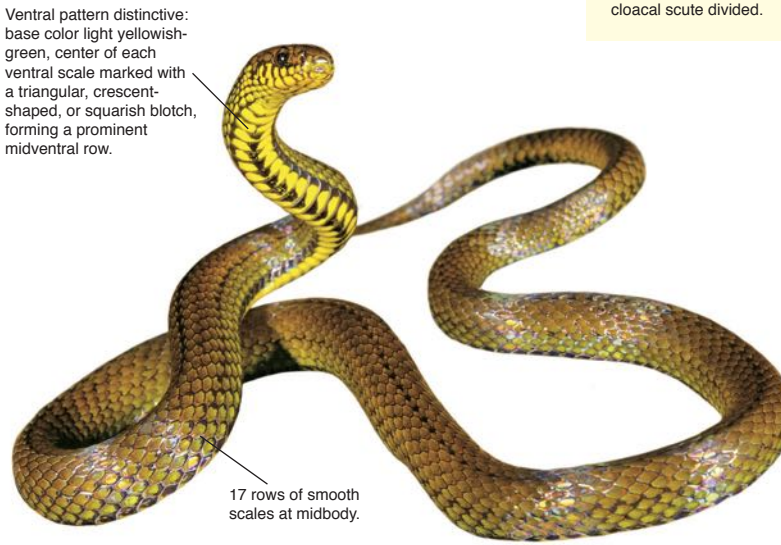
This is an oviparous species, known to lay clutches of up to eight eggs at the start of the rainy season (March–June). An interesting observation of a communal nest from the border region with Panama indicated that possibly as many as 10 different females had deposited 38 eggs in one location, beneath fallen palm fronds. Four additional gravid females were found in the nest at the time of discovery, while two more entered the nest in subsequent weeks, adding another 19 eggs in total.

Description



Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 141–156; 46–68 paired subcaudals; cloacal scute divided.



On adults, dorsum is marked with five longitudinal dark stripes that can be difficult to discern in very dark individuals. Dorsum is generally is green, bright yellowish-green to dark olive green. Small juveniles are marked with shades of brown and cream.

Similar species

- Other *Rhadinaea* or *Rhadinella* (pp. 498–501) species have a uniform white, cream, or yellow venter, without central dark markings.
- *Ninia psephota* (p. 482) can have a yellow venter marked with dark blotches, but the blotches never form a single line down the center; it has heavily keeled dorsal scales.
- *Geophis godmani* (p. 452) has a uniform cream to bright yellow venter and usually a yellow snout tip.

Rhadinaea decorata

Least concern

Red-bellied Litter Snake (*Hojarasquera de Vientre Rojo*)

Small to medium-sized, with a cylindrical body and very long tail; eyes large, with round pupils. Dorsum dark brown, with a pair of light dorsolateral stripes that are most prominently indicated on the anterior portion of the body; has a pair of dark-bordered light spots on the neck, and a dark-bordered, pale postocular stripe on either side of the head. Venter uniform reddish-orange in most populations. Total length to 19.5 in (49.5 cm).

Rhadinaea decorata has a large but disjunct distribution. On the Atlantic slope, it occurs in central Mexico south to Colombia; on the Pacific slope, it occurs from southwestern Costa Rica to western Ecuador. From near sea level to at least 3935 ft (1200 m).

Natural history

Rhadinaea decorata is a common but inconspicuous inhabitant of the leaf litter layer in relatively pristine, humid forests throughout the Costa Rican lowlands. It is diurnal and terrestrial and is usually seen in the vicinity of streams or other wetlands. This species feeds on small leaf litter frogs (genera *Craugastor* and *Pristimantis*) and their eggs but will also readily consume other amphibians and their tadpoles (frogs in the genera *Craugastor* and *Pristimantis* reproduce through direct development and do not have free-swimming tadpoles). *Rhadinaea decorata* reportedly can eat strawberry poison-dart frogs (*Oophaga pumilio*) without being affected by the potent skin toxins. One individual was observed catching and eating a small ground anole (*Anolis humilis*), and an old report indicates that this species also sometimes feeds on earthworms.

Prey is immobilized by a mild venom that is injected through enlarged fangs in the back of the mouth; *Rhadinaea decorata* poses no threat to humans and does not attempt to bite when handled. It does, however, exude a foul-smelling musk from glands near the vent to discourage predators from eating it.

Rhadinaea decorata is oviparous; clutch size ranges from 2–4 eggs. No information is available on the timing of reproduction, but hatching is likely synchronized with periods of increased amphibian breeding to provide ample nutrition for the small hatchlings.

Description

Ventral scales number 111–125; 85–109 paired subcaudals; cloacal scute divided.

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Has a conspicuous, short postocular stripe and a white spot on each side of the head; both pale markings are generally bordered by dark pigment.

Top of head with nine enlarged, symmetrical plates.

Eyes large, with round pupils and a reddish-copper iris that is slightly lighter in hue in the top half.

Labial shields white or cream, usually bordered above by a thin dark line.

Edges of ventral scales marked with a bold black dot; most prominent on the white ventral scales covering the throat and anterior part of the body.

Underside of chin and throat white to cream, but gradually changes to bright orange-red with age. Populations on the southern Pacific slope have an entirely cream-colored venter instead of red.

Similar species

- *Urotheca guentheri* (p. 535) has an orange venter and brown dorsum, marked with paired dorsolateral and lateral white stripes.
- *Coniophanes fissidens* (p. 426) has bold black speckling on its light-colored venter and on the supralabial scales.
- *Trimetopon slevinii* (p. 524) has an orange-red venter and a pair of discrete pale spots on the top of the head (not dark-bordered ocelli on the neck).

Rhadinaea pulveriventris

Least concern

White-lipped Litter Snake (*Hojarasquera de Labios Blancos*)

Small, slender, and long-tailed, with a cylindrical body; eyes large, with round pupils. Dorsum pale brown to bronze, with a slightly paler middorsal field bordered by thin dark lines. Sides of head and neck with a light-bordered, broad dark stripe that ends on neck; labial scales white or cream. Total length to 19.7 in (50 cm).

Rhadinaea pulveriventris occurs at middle elevations in the Central and Talamanca mountain ranges of Costa Rica, and in adjacent western Panama; 4265–5250 ft (1300–1600 m).

Natural history

Rhadinaea pulveriventris is a poorly known, rarely seen snake of montane regions. It is diurnal and terrestrial, and it has been reported from the leaf litter in cloud forest habitat. Based on the dietary preferences of other *Rhadinaea* species, it likely feeds on frogs, small lizards, and possibly terrestrial salamanders, but more research is needed to confirm this.

It is unclear how this and other middle elevation and highland snakes that specialize on eating frogs have fared since the catastrophic decline in amphibian populations that began in the late 1980s. It is likely that a significant reduction in prey availability has negatively impacted *Rhadinaea pulveriventris*.

This is an oviparous species, reportedly producing clutches of four or five eggs.

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 119–134; 63–80 paired subcaudals; cloacal scute divided.

Head relatively small, somewhat flattened and slightly wider than neck.

Dorsum brown to bronze, with a slightly lighter broad middorsal field.

Middorsal field bordered by a thin dark line, or linear series of dark and light spots; most prominent on the anterior portion of the body.

Eyes large, with round pupils and a dark bronze iris.

Supralabials cream or white.

A dark band on both sides of the head extends from the tip of the snout backward onto the neck; usually bordered above by an irregular light (white, cream) line.

Ventral surfaces mostly uniform white to cream; sometimes with dark speckling.

17 rows of smooth scales at midbody.

Small and fairly slender, with a cylindrical body and long tail.

Similar species

- *Coniophanes fissidens* (p. 426) has boldly spotted labial and ventral scales.
- *Rhadinella serperaster* (p. 500) has dark labial scales with a central white spot, and a complex pattern of many dark and light-colored dorsal stripes.
- *Rhadinaea calligaster* (p. 492) typically has black markings along the edges of each labial scale, and a linear series of black spots along the midline of the ventral scales.

Rhadinella godmani

Least concern

Yellow-bellied Litter Snake (*Hojarasquera de Vientre Amarillo*)

Small to medium-sized, slender, with a small head, moderate-sized eyes, and round pupils. Dorsum pale brown, reddish-brown, or olive-gray, with a variable number of dark dorsal stripes; middorsal and lateral stripes most prominent. A pair of thinner lines usually flank the middorsal stripe. Labial scales white to cream, bordered by black pigment. Venter uniform white to yellow. Total length to 24.4 in (62 cm).

Rhadinella godmani has a large but discontinuous distribution. It occurs throughout the highlands of Central America, from southern Mexico to western Panama. In Costa Rica, it has been reported from the Central and Talamanca mountain ranges; 4100–8695 ft (1250–2650 m).

Natural history

This is a relatively poorly known highland snake. *Rhadinella godmani* is a diurnal, terrestrial species of cloud forest and other montane forest types. It readily survives in open, disturbed habitats such as pastures and agricultural lands, provided sufficient forest habitat remains nearby. Surface activity of most high elevation reptiles is limited during periods of unfavorable weather, and generally these animals retreat into a suitable microhabitat awaiting better conditions. *Rhadinella godmani* has been found hiding below moss mats, accumulations of plant matter, logs, rocks, or other cover objects. Individuals have been observed entering into a state of torpor at night, when temperatures can drop into the high 40s and low 50s ˚F (7–13 ˚C). These snakes are completely unresponsive, without pupil or muscle reflexes, until their core temperature rises to at least 60 ˚F (16 ˚C).

No information exists on the diet of *Rhadinella godmani*; it may prey on amphibian and small reptiles like the closely related *Rhadinaea* species, or perhaps it specializes on reptile eggs like *Rhadinella serperaster*. Additional observations are needed to clarify this.

Rhadinella godmani is oviparous; it produces clutches containing up to five eggs.

This species was until recently included in the genus *Rhadinaea* and is listed as *Rhadinaea godmani* in most literature.

Description

Top of head with nine enlarged, symmetrical plates.

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 169–180; 73–94 paired subcaudals; cloacal scute divided.

Head small, slightly wider than neck, with a rounded snout.

Often with a pair of poorly defined pale spots on parietal scales.

Labial scales marked with white or cream, usually bordered by dark pigment

Ventral surfaces uniform pale to deep yellow in adults, white to cream in juveniles.

Top of head usually relatively uniform brown or reddish-brown, with some dark mottling. Head coloration contrasts sharply with juvenile color pattern, which is generally quite a bit lighter (pale brown, tan, or reddish-brown) than the adult dark brown dorsal coloration.

Similar species

- *Rhadinella serperaster* (p. 500) has an equally complex striped dorsal pattern, but differs in having 19 dorsal scale rows at midbody.

Rhadinella serperaster

Striped Litter Snake (*Hojarasquera Rayada*)

Least concern

Small, slender, and with a small head. Eyes of moderate size, with round pupils. Dorsum tan to pale brown, with a complex pattern of numerous dark dorsal stripes; bold lateral stripes sometimes have a pale center. Labial scales are dark, each marked with a white or cream central spot. Venter uniform white to cream. Total length to 19.7 in (50 cm).

Rhadinella serperaster is a Costa Rican endemic, found in isolated highland areas of the Tilarán, Central, and Talamanca mountain ranges; 3935–7215 ft (1200–2200 m).

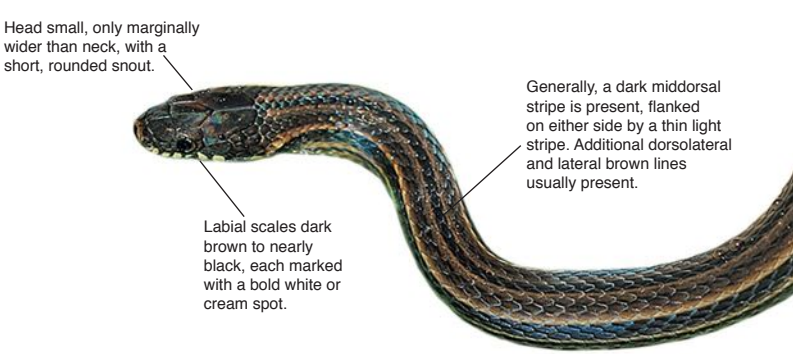
Natural history

Rhadinella serperaster is a rarely seen and poorly known highland snake. It is diurnal and both terrestrial and semi-fossorial. Individuals have been observed crawling on the surface, but they are more often encountered hiding below moss mats, logs, boards, or other cover objects. Reports of these snakes well below the surface (up to 1.5 ft [50 cm]) suggest that they are capable of burrowing into loose soil, or able to follow existing insect burrows. *Rhadinella serperaster* has been found in the company of other burrowing snakes, particularly *Geophis* species, and is thought to prey on their eggs. Reptile eggs, sliced open on one end to extract their content, were found in the stomach of one individual. *Rhadinella serperaster* likely uses its enlarged rear fangs to puncture these eggs.

Rhadinella serperaster is oviparous and produces clutches of up to six eggs. Hatchlings have been observed during the dry season (in January and February).

This species is seemingly restricted to Costa Rica; individuals reported from Panama are misidentified *Rhadinella godmani*. It was previously included in the genus *Rhadinaea* and appears in older literature as such.

Description



Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 156–172; 66–79 paired subcaudals; cloacal scute divided.

Dorsum pale yellowish-brown, grayish-brown, or reddish-brown, with many dark brown stripes of varying thickness that run the length of the body and tail.

19 rows of smooth scales at midbody.

Top of head usually dark brown, marked with a pair of irregular pale blotches.

Relatively slender, with a nearly cylindrical body and long tail.

Usually a broad dark lateral stripe is present on each side of the body; it may be bisected by a very thin light line.

Ventral surfaces of tail, body, and chin uniform white, cream, or pale yellow.

Similar species

- *Rhadinella godmani* (p. 498) is the only other highland snake with a striped pattern that is equally complex; it differs in having 21 dorsal scale rows at midbody.

Sibon annulatus

Least concern

Red-ringed Snail-eater (*Caracolera de Anillos Rojos*)

Small and exceedingly slender, with a compressed body, long prehensile tail, and blunt snout; large eyes with vertically elliptical pupils and a reddish-brown iris. Color pattern consists of many dark-bordered brown bands on the body and tail, alternating on the lower half of the body with white bands and on the upper half of the head, body, and tail with olive, grayish-green, or orange coloration. Total length to 22.0 in (56 cm).

Sibon annulatus ranges along the Atlantic slope from eastern Honduras southward to eastern Panama; it also occurs on the Pacific slope of central and eastern Panama; from near sea level to 5575 ft (1700 m).

Natural history

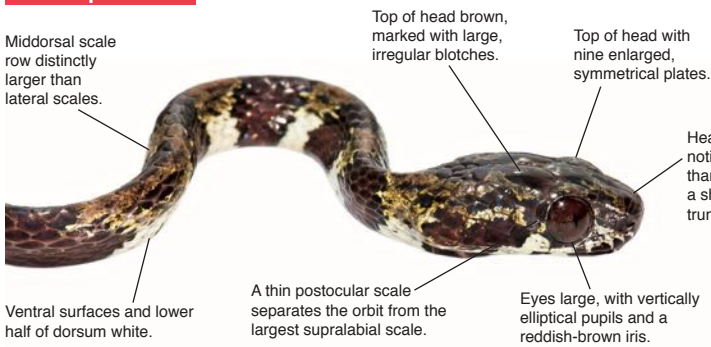
This tiny, skinny arboreal snake is most frequently seen at night as it moves through small trees and shrubs in search of prey. *Sibon annulatus* is a common inhabitant of mostly undisturbed wet forest habitats and is found 5–15 ft (1.5–5 m) above the ground. One individual was found during the day, coiled inside a bromeliad in the subcanopy, at a height of about 65 ft (20 m); it is possible that these snakes readily ascend into the canopy at times.

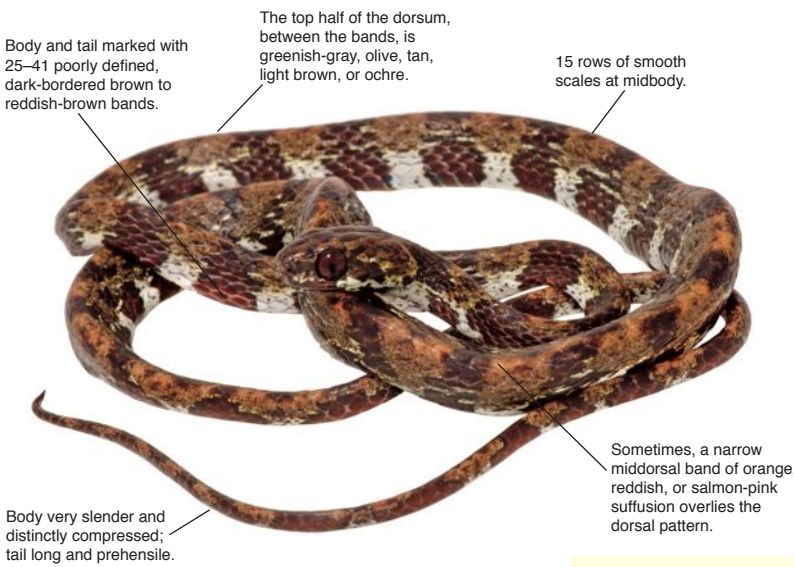
Sibon annulatus is a typical member of the snail-eating guild of New World snakes. Its skinny, compressed body and prehensile tail facilitate an arboreal lifestyle; the large, blunt-snouted head with specially adapted tooth, jaw, and skull morphology allows it to extract snails from their shells, and consume other "gooey" prey. These snakes are completely harmless to humans.

Sibon annulatus is oviparous and reportedly produces clutches of up to six eggs. Eggs have been recorded early in the rainy season (May), while young juveniles have been seen between June and September. Hatching of the eggs likely is synchronized with periods of increased rainfall, because the corresponding higher humidity generates conditions conducive to higher prey densities.

These tiny snakes are sometimes found in arboreal bromeliads, where they retreat to escape the heat and bright sun.

Description





Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 161–184; 108–137 paired subcaudals; cloacal scute undivided.

Similar species

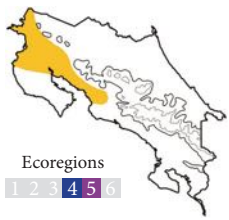
- Juvenile *Sibon dimidiatus* (p. 508) are nearly identical in coloration; adults have a pattern of dark gray or brown bands, interspersed with diffuse orange, salmon, or tan bands. Both species are geographically separated.
- *Sibon lamari* (p. 510) has a green dorsum, with a pattern of reddish-brown vertical bands.
- Other *Sibon* species do not have reddish-brown eyes.
- *Dipsas articulata* (p. 434) has a pattern of dark and pale rings that encircle the body completely; each pale ring is marked with a reddish stripe or blotch.

Sibon anthracops

Ringed Snail-eater (*Caracolera Anillada*)

Least concern

Medium-sized, with a strongly compressed body, moderately large head, bluntly rounded snout, and very large eyes. Has alternating black and cream rings on body and tail; cream rings infused with bright orange-red, most prominently on posterior portion of body and tail. Total length to 25.6 in (65 cm).



Sibon anthracops occurs on the Pacific slope, from eastern Guatemala to the northwestern lowlands and western Central Valley of Costa Rica; it also occurs on the Atlantic slope, in northeastern Honduras. From near sea level to 3280 ft (1000 m).

Natural history

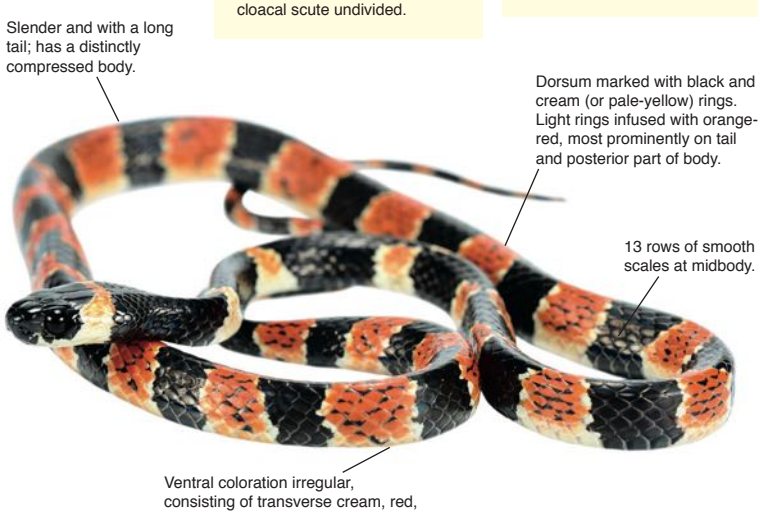
This beautiful nocturnal snake is one of the most terrestrial species of *Sibon* in Costa Rica. Like other species in its genus, it readily climbs trees and shrubs, but *Sibon anthracops* is most often encountered on the ground. It inhabits moist forest habitats, but also persists in disturbed habitats and gardens so long as there is sufficient vegetation. In dry forest areas, these snakes are often found in humid microhabitats such as vegetated stream banks.

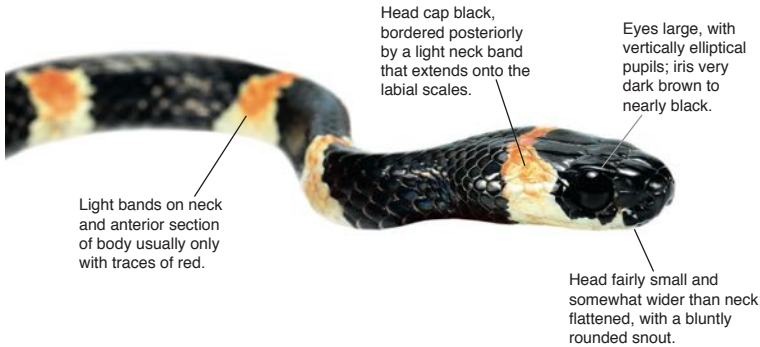
Sibon anthracops is thought to feed on slugs and snails. It is an oviparous species, known to produce clutches of up to three eggs.

Description

Ventral scales number 166–188; 73–91 paired subcaudals; cloacal scute undivided.

Dentition aglyphous; all maxillary teeth similar in size.





There are several species of coralnake mimics in Costa Rica, but none have the bluntly rounded snout of *Sibon anthracops*.

Similar species

- *Dipsas articulata* (p. 434) has a pattern of dark and light-colored rings that completely encircle the body; there is usually a red middorsal stripe in the light body rings; it has 15 dorsal scale rows.
- *Tropidodipsas sartorii* (p. 529) has a cylindrical body; it has 17 dorsal scale rows.
- *Scolecophis atrocinctus* (p. 390) has round pupils and usually a light-colored bar across the prefrontal scales, on top of the snout.
- Juvenile *Oxyrhopus petola* (p. 488) have a pattern of cream and black bands that may be suffused with orange; their ventral surfaces are uniform white.

Sibon argus

Least concern

Blotched Snail-eater (*Caracolera de Cabeza Chata*)

Medium-sized and slender, with a compressed body and prehensile tail. Has a very short snout and large eyes, with vertically elliptical pupils. Typically, one greatly enlarged supralabial scale is in direct contact with the eye on each side of the head. Total length to 27.6 in (70 cm).

Sibon argus occurs in southeastern Costa Rica and Panama, mainly on the Atlantic slope but also locally on the Pacific slope of central and eastern Panama; from near sea level to 2950 ft (900 m).

Natural history

An enigmatic, rarely seen species of *Sibon*, similar in appearance to several other species in this genus, and with a restricted distribution range in Costa Rica. This is one of three Costa Rican *Sibon* with a green dorsal coloration, the other two being *Sibon lamari* and *Sibon longifrenis*. *Sibon argus* is easily mistaken for the more widespread *Sibon longifrenis*, and therefore natural history information that is specifically pertinent to it is scarce.

This nocturnal species inhabits relatively pristine forest habitats and is most frequently seen in vegetation associated with streams. Its diet likely includes snails and slugs, as is the case with other *Sibon* species, but *Sibon argus* has also been reported to eat earthworms, as well as the eggs of glass frogs (family Centrolenidae), which are generally attached to a leaf that overhangs a stream. Anecdotal data suggests that this species may have decreased in numbers as a result of a decline in amphibian populations.

No information exists on the reproductive biology of this species, other than that it is oviparous.

Sibon argus is an inoffensive snake that never attempts to bite. When threatened, this small snake tends to roll into a ball with its head hidden in the center.

The defensive posture of these innocuous snakes generally involves coiling the body and hiding the head in the center of the coil, a defensive behavior not seen in other *Sibon* species.

Description

Top of head with nine enlarged, symmetrical plates.

Dentition aglyphous; all maxillary teeth similar in size.

Top of head marked with irregularly shaped, reddish brown blotches, each outlined with a dark brown or black border.

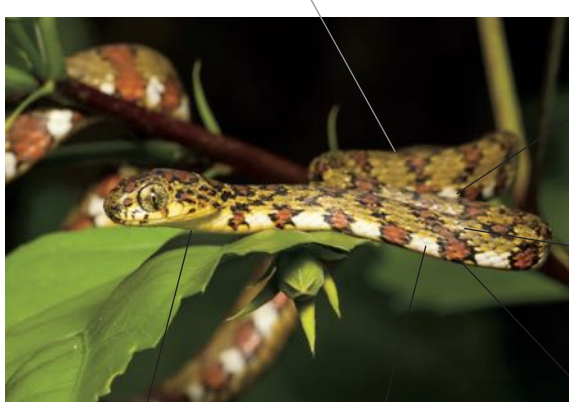
Head fairly small, somewhat wider than neck. Snout short and bluntly rounded.

A greatly enlarged supralabial scale is in direct contact with the eye (compare with *Sibon annulatus*, p. 502).

Eyes strikingly large and bulging; pupils vertically elliptical and iris golden-yellow, with dark reticulations.

Ventral scales number 181–201; 12–121 paired subcaudals; cloacal scute undivided.

Slender and long-tailed, with a distinctly compressed body.



A series of dark-edged reddish-brown to brown spots is located on the lower half of the body; these alternate with white spots.

Dorsum leaf-green to yellow-green, marked with black-bordered reddish-brown or orange-red ocelli.

15 rows of smooth scales at midbody.

Ventral surfaces of chin and neck cream to pale yellow.

Ventral coloration cream, with dark mottling. Borders of dark-edged ocelli form an irregular zig-zag pattern along both sides of the ventral scales.

Similar species

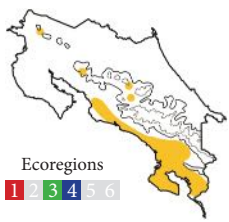
- *Sibon longifrenis* (p. 512) has significantly smaller eyes and a less rounded head; it has fewer ventral scales.
- *Sibon lamari* (p. 510) has a broad head that is distinctly wider than the neck, a banded rather than spotted dorsal pattern, and prominent rufous eyes.

Sibon dimidiatus

Least concern

Orange-ringed Snail-eater (*Caracolera de Bandas Anaranjadas*)

Medium-sized and slender, with a distinctly compressed body, prehensile tail, blunt snout, and large eyes with vertically elliptical pupils. Adults have a dark gray or dark brown dorsum, marked with broad diffuse orange, salmon, or tan bands that are roughly the same width as the interspaces. Juveniles closely resemble *Sibon annulata*. Total length to 27.6 in (70 cm).



Sibon dimidiatus has a discontinuous range along the Pacific slope of Central America, from Veracruz, Mexico, south to extreme soutwestern Costa Rica. A recent record from the highlands above Heredia, Costa Rica, extends the range of this species onto the Atlantic slope. It likely also occurs in adjacent western Panama. From near sea level to 6400 ft (1950 m).

Natural history

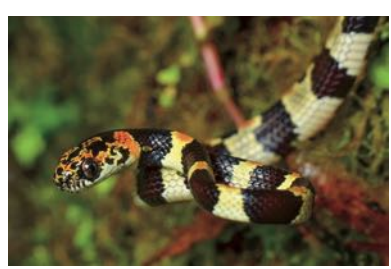
Sibon dimidiatus is an uncommon species that is similar in appearance to several other Costa Rican *Sibon*. It is arboreal and inhabits relatively pristine forests, where it is mostly seen climbing in low vegetation at night. It generally favors wet environments and seems to prefer cloud forest habitat; it is also found in the Pacific lowlands, where it tends to be associated with riparian vegetation near forest streams. During the day, it retreats under loose bark, or coils up in large arboreal bromeliads.

It is thought to be a specialized predator of snails and slugs. Like other species in the genus, adaptations in the skull, jaws, and teeth enable these snakes to extract snails from their shell and eat them.

Sibon dimidiatus is oviparous and clutches of two or three eggs have been documented. An observation of three hatchlings of this species together in the leaf litter suggests that the eggs are deposited on the forest floor.

Juveniles of this species have been confused with *Sibon annulatus*, which looks nearly identical to juvenile *Sibon dimidiatus*. The two species can reliably be told apart only on the basis of scalation characteristics. Adult *Sibon dimidiatus*, however, are much more similar to *Sibon nebulatus* in coloration and morphology, though they differ in having pale orange, salmon, or tan bands.

Sibon dimidiatus occurs in several widely separated populations throughout Central America. Those inhabiting mountainous areas are sometimes separated from one another by hundreds of miles, with no opportunity for the exchange of genetic material. It is possible that genetically isolated, cryptic taxa are hidden within this species. The recent discovery of an adult in Cerro Dantas, Heredia Province, seems to represent the only record of this species on the Atlantic slope in Costa Rica, adding to the enigmatic nature of *Sibon dimidiatus*.



This juvenile *Sibon dimidiatus* from northern Nicaragua shows an unusual color pattern. It is possible that montane populations of this species differ from the Pacific lowland populations found in southwestern Costa Rica, but further research is needed.

Description

Eyes large, with vertically elliptical pupils and a darkly mottled, reddish-bronze iris.

Top of head mostly same color as dorsum, with dark speckling and some irregularly shaped dark blotches.

Ventral scales number 178–200; 107–125 paired subcaudals; cloacal scute undivided.

Head large and distinctly wider than neck; snout short and bluntly truncated.

adult

Body very slender and compressed; tail long and prehensile.

Ventral surfaces and lower part of dorsum white or cream, interrupted by brown rings that extend somewhat onto venter.

Middorsal scale row not distinctly larger than lateral scales.

Adults with pale gray, slate-gray, or dark brown dorsal coloration, marked with broad pale orange, salmon, or tan bands that are roughly the same width as the interspaces.

Dentition aglyphous; all maxillar teeth similar in size.

The top half of the dorsum, between the bands, is yellowish-green, greenish- gray, olive, or light brown in juveniles; interspaces considerably wider than rings.

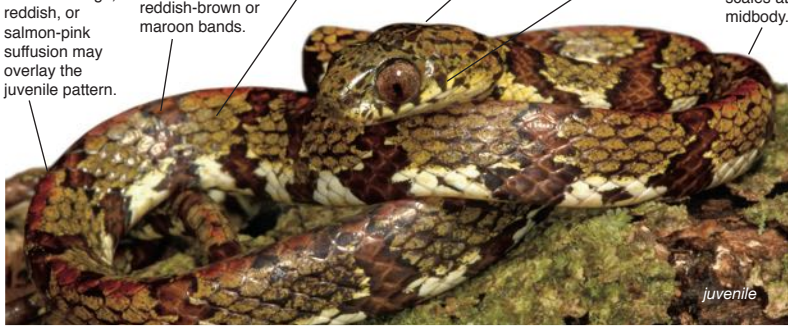
Top of head with nine enlarged, symmetrical plates.

Chin and neck pale yellow or cream, with scattered brown blotches.

15 rows of smooth scales at midbody.

Body and tail marked with 23–45 narrow, poorly defined dark-bordered reddish-brown or maroon bands.

A narrow middorsal band of orange, reddish, or salmon-pink suffusion may overlay the juvenile pattern.



juvenile

Similar species

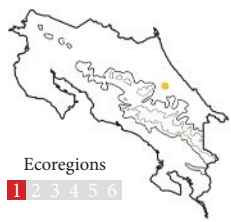
- *Sibon annulatus* (p. 502) is similar in appearance to juvenile *Sibon dimidiatus*, but the two species do not co-occur in Costa Rica.
- *Sibon nebulatus* (p. 514) has a comparable morphology and a similar dark gray base color, but it never has broad orange, salmon, or tan bands.
- *Dipsas tenuissima* (p. 436) lacks a pattern of alternating dark and orange, salmon, or tan bands.

Sibon lamari

Vulnerable

Costa Rican Snail-eater (*Caracolera Costarricense*)

Medium-sized and slender, with a distinctly compressed body, long prehensile tail, short snout, and large eyes with vertically elliptical pupils and a reddish-brown iris. Dorsal coloration mottled yellowish-green to green, with a pattern of many dark-bordered reddish-brown bands on the body and tail. Total length to 23.2 in (59 cm).



In Costa Rica, *Sibon lamari* is only known from the Guayacán de Siquirres area in Limón Province; 1805–2460 ft (550–750 m). It was recently found in central and eastern Panama.

Natural history

A small, slender arboreal snake that is only known from a few Costa Rican records. It has been documented in the Guayacán de Siquirres region, in Costa Rica, but recent records from Panama suggest that *Sibon lamari* is more widespread than current records indicate; it likely occurs in the Atlantic foothills of the Talamanca Mountain Range.

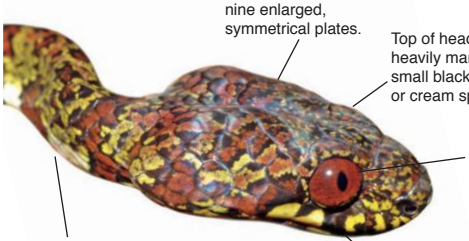
Most individual *Sibon lamari* have been found at night as they climb about in vegetation, 6–25 ft (2–8 m) above the ground. It inhabits the interior of undisturbed rainforest habitats and is usually found in vegetation alongside streams.

Sibon lamari has been documented eating snails, and presumably also feeds on slugs. Related species with similar habitat preferences such as *Sibon argus* have been found to also prey on frog eggs, particulary the arboreal eggs of glass frogs (family Centrolenidae), which are generally deposited on leaves that overhang streams. Whether this species includes frog eggs in its diet remains to be confirmed.

An egg clutch of *Sibon lamari* has been documented during the month of August, in the rainy season. This is an appropriate time to expect higher densities of the slugs, snails, and frog eggs needed to feed the small juvenile snakes.

Together with *Sibon argus* and *Sibon longifrenis*, this species forms a group of three Costa Rican *Sibon* with a green dorsum and similar habits. In the Guayacán de Siquirres region, all three species co-occur, as do *Sibon annulatus* and *Sibon nebulatus*.

Description



Ventral scales number 163–170; 77–116 paired subcaudals; cloacal scute undivided.

Dentition aglyphous; all maxillary teeth similar in size.

15 rows of smooth scales at midbody.

Dorsum yellowish-green to green, heavily peppered with small dark specks.

A pattern of 29–40 irregularly shaped, dark-bordered reddish-brown bands on either side of the body and tail; bands are joined middorsally.

Tail long, thin, and prehensile.

This small *Sibon* from western Panama is likely a juvenile *Sibon lamari*. Note the characteristic red eyes and mottled pattern on the top of its head; the banded pattern on the body and tail is much more pronounced than in adults and it lacks the yellowish-green coloration between the brown bands.

Similar species

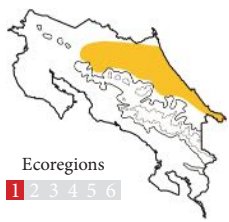
- *Sibon argus* (p. 506) has a dorsal pattern of dark-rimmed reddish ocelli. It has huge bulging eyes with a golden-yellow iris and more than 180 ventral scales.
- *Sibon longifrenis* (p. 512) has a dorsal pattern of dark-rimmed reddish ocelli. It has small eyes with a greenish gray iris and fewer than 175 ventral scales.

Sibon longifrenis

Least concern

Mottled Snail-eater (*Caracolera de Manchas Rojas*)

Medium-sized and slender, with a distinctly compressed body, long prehensile tail, and short snout. Has large eyes with vertically elliptical pupils and a silver-green iris. Dorsum olive or grayish-green, with a middorsal series of reddish-brown circular spots, each outlined in black; a similar series of spots on the lower body alternates with white blotches. Total length to 25.2 in (64 cm).



Sibon longifrenis occurs on the Atlantic slope, from eastern Honduras to western Panama; from near sea level to 2625 ft (800 m).

Natural history

Sibon longifrenis is the most widespread Costa Rican *Sibon* with a green dorsal coloration; it is also far more common than the other two, *Sibon argus* and *Sibon lamari*. *Sibon longifrenis* is mostly seen at night in dense rainforests. Individuals climb about on large leaves or branches, 3–7 ft (1–2 m) above the ground, often near streams. Like other *Sibon* species, it feeds on slugs and snails, which are extracted from their shell using the specially adapted teeth, jaw, and skull morphology seen in this genus. These snakes will insert their lower jaw into the snail's shell and hook the soft body parts with their needle-like teeth. While holding the shell in its coils, the snake extracts the snail little by little. Once the connection between the snail's body and its protective housing is broken, the gooey meal is swallowed, and the shell discarded.

When threatened, these inoffensive snakes often coil the neck in an S-curve, flatten the head, and spread their jaws. The resulting triangular head and the lichenous color pattern can make them appear surprisingly like a dangerous eyelash pitviper (*Bothriechis schlegelii*). It will never bite, however, and poses no threat to humans.

Sibon longifrenis is oviparous, but nothing is known about its clutch size or breeding cycle. Gravid females have been observed in March, which would likely mean that eggs are laid early in the rainy season and young hatch when prevailing rainy conditions boost the availability of prey.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 151–173; 82–103 paired subcaudals; cloacal scute undivided.

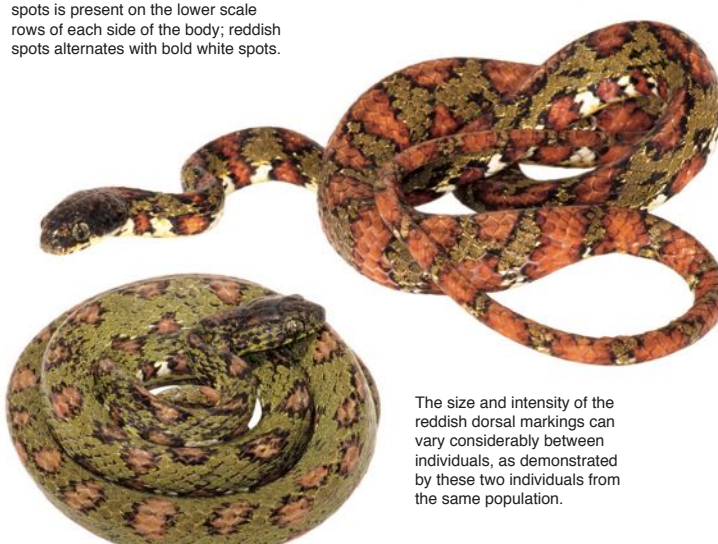
15 rows of smooth scales at midbody.

Dorsal coloration olive or grayish-green, with a middorsal series of reddish-brown circular spots, each outlined in black.

Small and slender; body compressed in cross-section.

Tail long, thin, and prehensile.

A series of dark-bordered reddish spots is present on the lower scale rows of each side of the body; reddish spots alternates with bold white spots.



The size and intensity of the reddish dorsal markings can vary considerably between individuals, as demonstrated by these two individuals from the same population.

Similar species

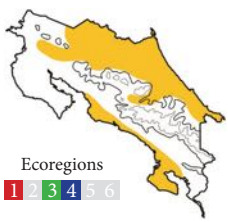
- *Sibon argus* (p. 506) has a dorsal pattern of dark-rimmed reddish ocelli. It has huge bulging eyes with a golden-yellow iris and a higher number (more than 180) of ventral scales.
- *Sibon lamari* (p. 510) has a broad head that is distinctly wider than the neck, a banded rather than spotted dorsal pattern, and prominent rufous eyes.

Sibon nebulatus

Clouded Snail-eater (*Caracolera Común*)

Least concern

Medium-sized and somewhat robust, with a strongly compressed body, a prehensile tail, a large head with a bluntly-rounded snout, and large eyes with vertically elliptical pupils. Dorsum gray, with a pattern of black bands on the body and tail; bands bordered on both sides by a linear series of cream or pale salmon-pink spots. Total length to 33.5 in (85 cm).



Sibon nebulatus occurs on both the Pacific and Atlantic slopes, in southeastern Mexico, Central America, and northern South America (Ecuador, Colombia, and Brazil). It also occurs on some Caribbean Islands. In Costa Rica, it is most common on the Atlantic slope and in the Pacific southwest, but it occurs sporadically elsewhere on the Pacific slope and in the Central Valley; from near sea level to 4920 ft (1500 m).

Natural history

A common and widespread species, found in a variety of habitat types, ranging from undisturbed, primary rainforest to parks, gardens, and developed areas. *Sibon nebulatus* is nocturnal. Although it is arboreal, it is also sometimes seen on the ground as it crosses open areas between trees.

This is another species that is highly specialized to feed on slugs and snails. The snails are extracted from their shell using modified jaw, tooth, and skull adaptations, and swallowed whole. *Sibon nebulatus* is completely inoffensive; it sometimes spreads its jaws to create the appearance of a triangular, viperlike head, but it never attempts to bite.

Sibon nebulatus is oviparous and can produce up to eight eggs per clutch. Limited data shows that this species may have a breeding season that lasts much of the year but slows down during the dry season. However, this situation may differ significantly between Atlantic slope and Pacific slope populations, given the difference in the climates on both coasts.

An aggregation of seven individuals observed in a single tree was reportedly attributed to feeding snakes, as the tree in question was covered in small snails at the time. The author has observed an aggregation of at least nine *Sibon nebulatus* in one small tree during the month of March, but on this occasion there was no evident concentration of prey items. Perhaps the gathering of various individuals represents a breeding aggregation, as both males and females were present.

Individuals from Pacific slope populations are generally more colorful than their monochromatic counterparts on the Atlantic slope.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 174–190; 79–106 paired subcaudals; cloacal scute undivided.

Similar species

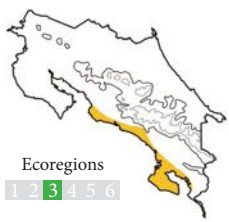
- *Dipsas tenuissima* (p. 436) can appear quite similar in dorsal coloration, but its dark bands competely encircle the body. It generally has a more slender, narrower head that is scarcely wider than the neck.
- Adult *Sibon dimidiatus* (p. 508) have a pattern of dark gray or dark brown bands that are interspersed with diffuse orange, salmon, or tan bands, not with dark mottling.
- Other species of *Sibon* have a very different color pattern.

Siphlophis compressus

Least concern

Red-eyed Tree Snake (*Culebra de Ojos Rojos*)

A striking , medium-sized snake with a laterally compressed body and large head. The combination of red and orange coloration on the head and body, and the long black neck band, is unique. There are 19 rows of dorsal scales, including a single middorsal row of distinctly enlarged scales. Total length at least 46.1 in (117 cm).



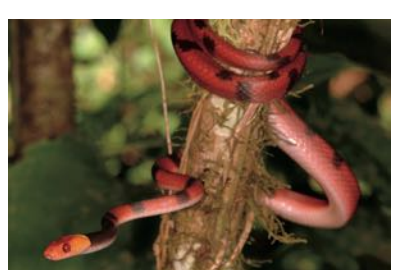
In Costa Rica, *Siphlophis compressus* is only found in the southwestern lowlands. It does also occur in disjunct populations, however, in eastern Panama and into the Amazon region of South America. From near sea level to 655 ft (200 m).

Natural history

Seven species are currently recognized in this predominantly South American genus, two of which occur in Central America. Only *Siphlophis compressus* ranges as far north as southwestern Costa Rica. It is a medium-sized arboreal snake with a distinctly compressed body. Nocturnal, *Siphlophis compressus* is infrequently seen and not much is known about its biology. It actively hunts at night, generally in low vegetation 3–15 ft (1–5 m) above the ground. It favors undisturbed wet forest in lowland regions. Within these forested areas, most individuals appear to be associated with vegetation along stream banks. *Siphlophis compressus* preys on a variety of lizards and has even been reported to scavenge a dead, road-killed South American canopy lizard *(Polychrus marmoratus*). Although lizards seem to make up the bulk of its diet, *Siphlophis compressus* is also known to occasionally feed on birds and small mammals.

Siphlophis compressus is oviparous, and clutches of up to 12 eggs have been reported. Interestingly, this species regularly deposits its eggs inside leaf-cutter ant (*Atta* sp.) nests. In addition, multiple females may utilize the same nest site, as a single nest reportedly contained eggs of different ages. Alternatively, these eggs may have been from the same female, but deposited at different dates. More research is needed to better understand the reproductive cycle of *Siphlophis compressus* in Costa Rica.

Siphlophis compressus was recently removed from the monotypic genus *Tripanurgos* and placed in *Siphlophis* based on hemipenis morphology; it is still listed as *Tripanurgos compressus* in older literature.

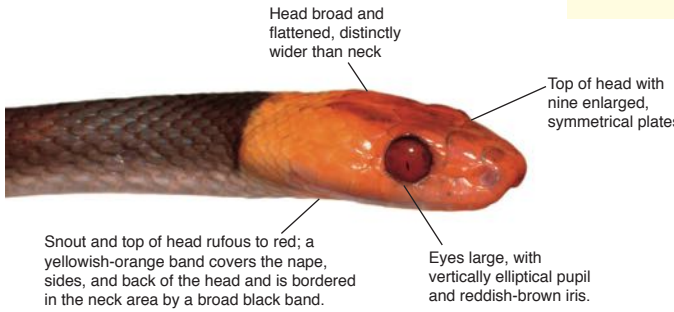


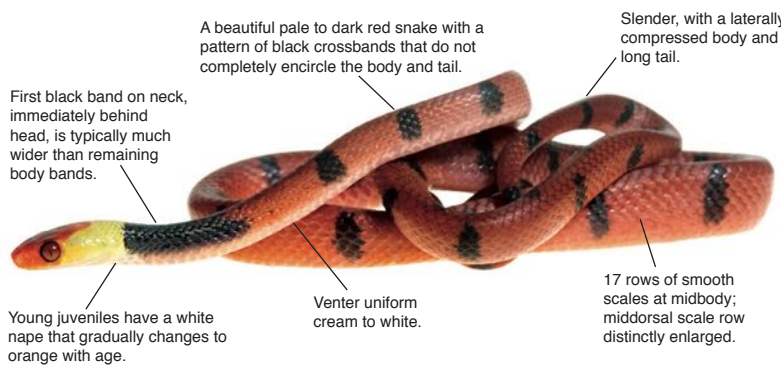
Siphlophis compressus is a highly arboreal species.

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 228–258; 110–125 paired subcaudals; cloacal scute undivided.





Similar species

- *Oxyrhopus petola* (p. 488) lacks a greatly enlarged middorsal scale row; the top of its head, including all enlarged plates, is black.

Tretanorhinus nigroluteus

Least concern

Keeled Mangrove Snake (*Culebra de Manglar Quillada*)

A medium-sized, aquatic snake. Stocky, with a head that is only slightly wider than the neck; snout bluntly rounded, with unique upward-directed nostrils. Body covered with 19–21 distinctly keeled scale rows. Dorsal coloration cryptic and brown, venter uniform light (orange to cream). Total length to 34.6 in (88 cm).

Tretanorhinus nigroluteus ranges along the Atlantic slope from southern Veracruz, Mexico, to central Panama; from near sea level to 2460 ft (750 m).

Natural history

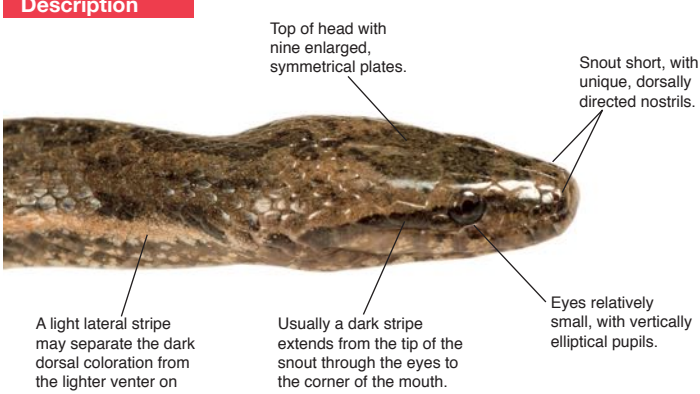
This genus consists of four species of medium-sized, semi-aquatic to aquatic snakes that inhabit freshwater streams, swamps, and occasionally the brackish water of mangrove forests. *Tretanorhinus nigroluteus* is the only species in the genus that occurs in Costa Rica.

This rare snake may be underreported because of its secretive aquatic and nocturnal habits, but few reports from Costa Rica exist. It spends much of its life in water, usually hidden in aquatic vegetation, with the body submerged and only the top of the head visible at the water surface. Its dorsally placed nostrils enable this snake to breathe at the water surface while only minimally exposing its body. When disturbed, these snakes rapidly dive to the bottom and hide. Although individuals are occasionally seen on land after dark, these snakes generally do not seem to leave the water during the day.

Tretanorhinus nigroluteus feeds on fish, tadpoles, and frogs, which are actively pursued or ambushed with a quick grab. In turn, these snakes fall prey to herons, egrets, turtles, caymans, and perhaps crabs.

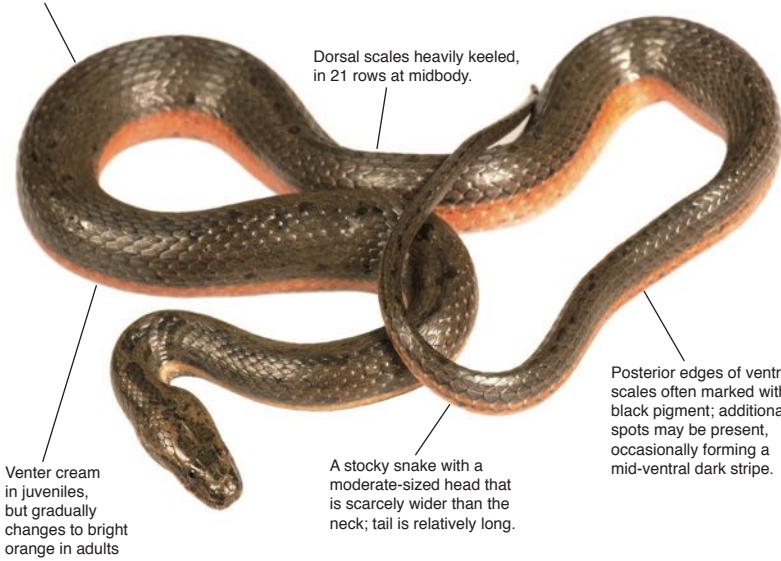
This snake is oviparous, capable of producing clutches of 6–9 eggs throughout the year.

Description

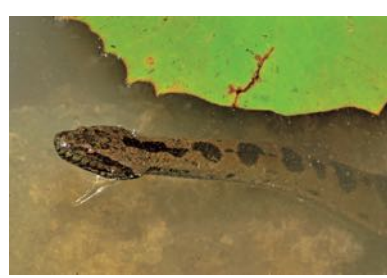


Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 127–151; 56–82 paired subcaudals; cloacal scute divided.



Individuals from northern populations tend to be almost uniform black dorsally, with an orange venter. The venter tends to be less bright (cream or tan) in populations in southern Mesoamerica.



Dorsum marked with a series of paired dark spots that run the length of the body to form two paravertebral series; occasionally these spots fuse to form dark transverse bars or a central row of large blotches.

Similar species

- *Hydromorphus concolor* (p. 462) is the only other uniformly colored aquatic snake in Costa Rica; it differs in having smooth dorsal scales.

Trimetopon gracile

Least concern

Costa Rican Pygmy Snake (*Culebra Enana Costarricense*)

Very small and slender; brown, with a pattern of obscure dark lines on the dorsum and tail, and a pair of pale-yellow spots on the nape. Venter white to pale yellow. Prefrontal scales fused into a single plate. Total length to 11.4 in (29 cm).

Trimetopon gracile is endemic to Costa Rica, where it is found in the Tilarán and Central mountain ranges, as well as locally in the northern end of the Talamanca Mountain Range; 4265–7380 ft (1300–2250 m).

Natural history

Trimetopon gracile is a tiny fossorial or semi-fossorial snake. It is rare, or rarely reported, and the few known individuals were found under logs or rocks, in leaf litter, or in burrows. It appears to prefer middle elevation wet forest habitat and has not been found in disturbed areas. Little is known about its biology. One individual was reported having eaten a worm salamander (*Oedipina uniformis*). *Trimetopon gracile* is thought to be oviparous.

Snakes of the genus *Trimetopon* are difficult to identify in the field due to their small size and generalized appearance. However, in a few species, including *Trimetopon gracilis*, the two prefrontal scales, which cover the top of the snout in most snakes, are fused to form a single large shield. These snakes are opisthoglyphous but harmless.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 140–154; 51–64 paired subcaudals; cloacal scute divided.

Similar species

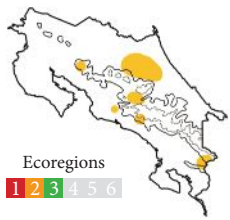
- *Trimetopon pliolepis* (p. 522) has a distinct pale yellow nuchal collar that is generally interrupted by a dark middorsal stripe.
- Other similar-looking snakes (some *Trimetopon*, *Tantilla*, *Rhadinaea*, and *Urotheca* species) have paired prefrontal scales instead of a single, enlarged scute on top of the snout.
- *Trimetopon slevini* (p. 525) has paired prefrontals, an orange venter, and a pair of distinct light-colored spots on the base of its neck.
- *Trimetopon viquezi* (p. 527) has paired prefrontals and a red venter.

Trimetopon pliolepis

Least concern

Collared Pygmy Snake (*Culebra Enana de Collar*)

Very small and slender; dark brown with a pattern of dark longitudinal stripes on the dorsum and tail. A pale-yellow collar is present in neck area, typically continuous with the light (pale-yellow to white) ventral color and interrupted middorsally. Prefrontal scales fused into a single plate. Total length to 11 in (28 cm).



Trimetopon pliolepis is known from isolated locations in the Atlantic lowlands, the Central Valley, and the Tilarán, Central, and Talamanca mountain ranges of Costa Rica, as well as in adjacent western Panama; 200–5085 ft (60–1550 m).

Natural history

The genus *Trimetopon* consists of six species of tiny fossorial to semi-fossorial snakes, all of which occur in lower Central America. All are infrequently observed and rare, even in collections. *Trimetopon pliolepis* inhabits the leaf litter of undisturbed moist and wet forests in lowlands and foothills. It is likely terrestrial and fossorial, spending considerable time underground, under cover objects or in burrows. Very little is known about its biology. *Trimetopon pliolepis* is thought to be oviparous, and apparently eats lizards. These tiny inoffensive snakes are opisthoglyphous but harmless to humans.

These snakes are difficult to identify in the field due to their small size and lack of any prominent features. Because of that, *Trimetopon* species are likely underreported and often mistaken for more commonly seen snakes in the genera *Tantilla*, *Rhadinaea*, or *Urotheca*.

Description

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 137–157; 58–73 paired subcaudals; cloacal scute divided.

Ventral surfaces white, cream, or pale yellow; either uniform or peppered with tiny dark specks. Underside of tail generally heavily mottled with dark pigment.

Similar species

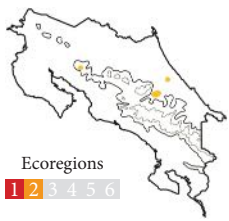
- *Trimetopon gracilis* (p. 520) has a pair of light spots (may be fused to form a light-colored bar) on the nape.
- Most similar-looking snakes (some *Trimetopon*, *Tantilla*, *Rhadinaea*, and *Urotheca* species) have paired prefrontal scales instead of a single, enlarged scute on top of the snout.
- *Trimetopon slevini* (p. 525) has paired prefrontals, an orange venter, and a pair of distinct pale spots on the base of its neck.
- *Trimetopon viquezi* (p. 527) has paired prefrontals and a red venter.

Trimetopon simile

Endangered

Forest Pygmy Snake (*Culebra Enana de Bosque*)

Very small and slender, with a small, rounded head. Uniform brown to nearly black, with uniform pale-yellow venter. Has a pale collar in the neck area that covers much of the parietal scales on the top of the head. Prefrontal scales fused into a single plate. Total length to 7.1 in (18 cm).



Trimetopon simile is endemic to Costa Rica. It has been found in a few locations in the Atlantic lowlands, from 165–2130 ft (50–650 m), as well as in the foothills of the Tilarán Mountain Range, up to 4920 ft (1500 m).

Natural history

This rare species is only known from a handful of individuals collected in lowland moist forest, premontane wet forest, and cloud forest. Nothing is known about its biology. It is a terestrial, semi-fossorial, or fossorial species, and likely lives in leaf litter, burrows, and under logs and rocks. Like other members of its genus, *Trimetopon simile* is ophistoglyphous. but harmless to humans. It is thought to be oviparous.

Description

- 15 rows of smooth scales at midbody.
- Top of head with eight enlarged, symmetrical plates; prefrontal scales are fused into a single shield.
- Dentition aglyphous; all maxillary teeth similar in size.
- Dorsum uniform dark brown, dark gray, or almost black.
- Venter is pale yellow, with no markings.
- A distinct light-colored nuchal collar crosses the base of neck and many of the large parietal scales on top of the head. This light collar is continuous with the light chin and underside of the head.
- Loreal scale present.
- Head small, with short rounded snout.
- Eyes small, with round pupils and bronze iris.

Similar species

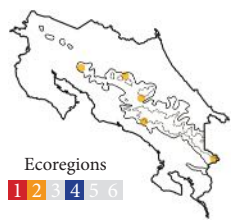
- Other similar-looking snakes (some *Trimetopon*, *Tantilla*, *Rhadinaea*, and *Urotheca* species) have paired prefrontal scales instead of a single, enlarged scute on top of the snout.
- *Trimetopon slevini* (p. 525) has paired prefrontals, an orange venter, a pair of discrete pale spots on the base of its neck, and a striped dorsal pattern.
- *Trimetopon viquezi* (p. 527) has paired prefrontals and a red venter.

Trimetopon slevini

Near threatened

Red-bellied Pygmy Snake (*Culebra Enana de Vientre Rojo*)

Small and slender, with a small head. Dorsum dark brown, with a pattern of obscure dark longitudinal stripes. Pale collar reduced to light blotches on the side of the neck; there is a pair of discrete light-colored (cream, pale yellow, or pale orange) spots on the top of the head. Venter uniform bright reddish-orange. Total length to 11.4 in (29 cm).



Trimetopon slevini occurs on the Atlantic slope, in the northern sections of the Central Mountain Range of Costa Rica. It also occurs on the Pacific slope of the Tilarán and Talamanca mountain ranges of Costa Rica and extreme western Panama. From 1475–5985 ft (450–1825 m).

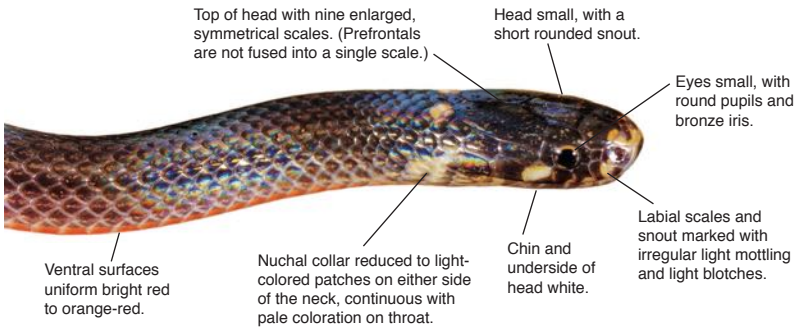
Natural history

All five Costa Rican species in the genus *Trimetopon* are rarely encountered and poorly known. These fossorial and semi-fossorial snakes are easily overlooked due to their small size and secretive habits, and are difficult to identify in the field because of their inconspicuous appearance. *Trimetopon slevini* is the only Costa Rican snake that has a dark dorsal pattern, an orange belly, and a unique pattern of two pale yellow or tan circular spots on the top of the head adjacent to the large parietal scales.

Very little is currently known about the biology of *Trimetopon slevini*. It has been reported from areas of mostly undisturbed premontane rainforest and cloud forest. A recent observation of a predation event by this species not only extended its distribution range well into the Talamanca Mountain Range, but also revealed a unique prey item for this and, arguably, any snake species. An adult *Trimetopon slevini* was observed probing into a mossy mat on the forest floor and extracting an onychophoran, a unique type of invertebrate commonly referred to as a velvet worm. The snake's head was covered in surface debris and dirt, likely as a result of the onychophoran's defensive strategy of spitting a glue-like substance at the source of a threat. The onychophoran was grabbed by the posterior half of its body and quickly swallowed alive, tailfirst. Onychophorans are highly unusual prey items for snakes; the only other report of such prey relates to a South American coralsnake (*Micrurus hemprichii*).

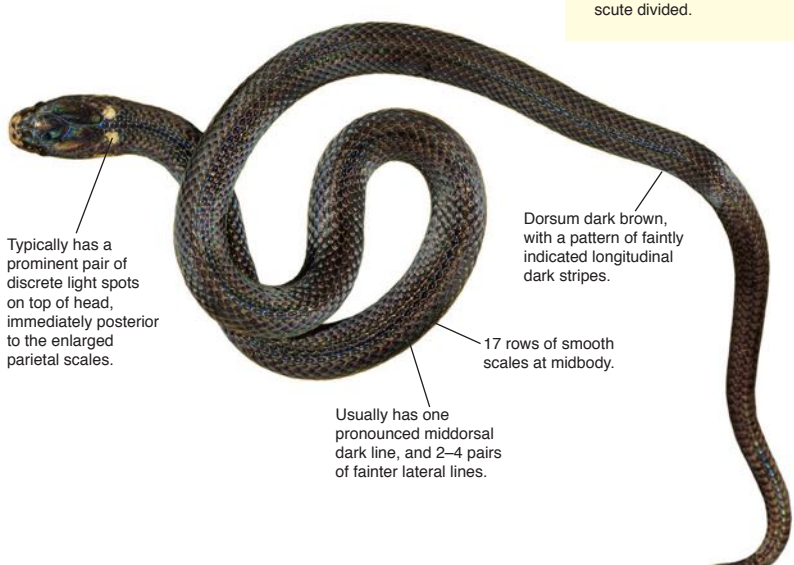
All *Trimetopon* species are tiny and rarely seen.

Description



Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 152–165; 43–64 paired subcaudals; cloacal scute divided.



Similar species

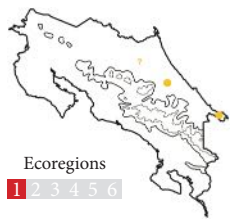
- Other *Trimetopon* species (*gracile*, *pliolepis*, *simile*) have their prefrontal scales fused into a single plate that covers the top of the snout.
- *Trimetopon viquezi* (p. 527) has paired prefrontals and lacks paired light spots on the top of its head.
- Most *Rhadinaea decorata* (p. 494) have an orange venter; all have a light spot behind each eye, on the side of the head, which is bordered by a black line (no dark border in *Trimetopon slevini*).
- *Urotheca guentheri* (p. 535) also has an orange venter and dark-bordered white ocelli on the side of the head.

Trimetopon viquezi

Critically endangered

Striped Pygmy Snake (*Culebra Enana Lineada*)

Very small and slender, with a small head. Dorsum dark brown with obscure dark longitudinal stripes, but without a pale nuchal collar or light spots on the head or neck. Venter uniform bright red. Total length to 9.5 in (24 cm), based on a single specimen with an incomplete tail.



Trimetopon viquezi is endemic to Costa Rica and has only been positively identified from an area near Siquirres, Limón Province, at 203 ft (62 m). A few of the sightings indicated on this map are unconfirmed.

Natural history

Trimetopon viquezi was described in 1937 from a single individual found in the Atlantic lowlands near Siquirres, Costa Rica. This holotype specimen is apparently now lost, precluding comparison with other individuals. Because of this, it has been impossible to confirm any possible new sightings. Given the location of the holotype, however, it may possibly occur throughout the Atlantic lowlands. A small snake perhaps attributable to this species was seen and photographed at La Selva Biological Station, near Puerto Viejo de Sarapiquí. This individual matched the existing description of *Trimetopon viquezi*, except that its ventral surfaces were white.

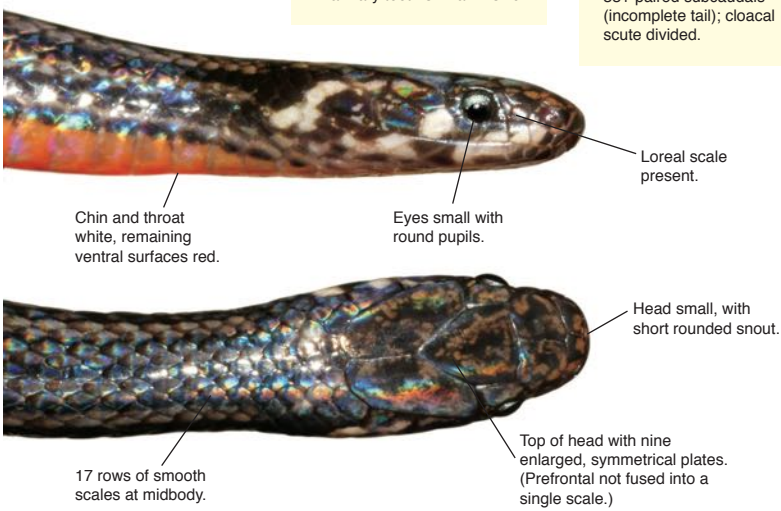
The photographs presented in this account depict a form of *Trimetopon* from the Kéköldi Indigenous Reserve in southern Limón Province. No other species in this genus are known from this area, and the limited information available from the holotype fits the animal featured here. Future sightings and collections will likely elucidate the status of *Trimetopon viquezi* in Costa Rica, and adjacent western Panama.

Trimetopon viquezi is thought to most resemble *Trimetopon barbouri*, which is endemic to Panama. The latter species typically has a cream venter that darkens posteriorly, and one or two pairs of light spots on top of its head. *Trimetopon barbouri* is mostly found at low elevations in the Canal Zone of Central Panama, but the recent discovery of this species at an elevation of 3,750 ft (1,142 m) in the Chiriquí highlands, close to the Costa Rica border, changes our perspective on these species. It is possible that these two species are actually conspecific, but this will not be resolved until additional individuals are discovered.

Description

Dentition aglyphous; all maxillary teeth similar in size.

161 ventral scales; 33+ paired subcaudals (incomplete tail); cloacal scute divided.



Body and tail dark brown to nearly black; marked with an indistinct middorsal dark stripe. There is a lateral stripe on the fourth scale row on either side of the body.

Similar species

- Other *Trimetopon* species (*gracile*, *pliolepis*, *simile*) have their prefrontal scales fused into a single plate that covers the top of the snout.
- *Trimetopon slevini* (p. 525) has paired prefrontals and has paired light spots on the top of its head.
- Most *Rhadinaea decorata* (p. 494) have an orange venter; all have a light spot behind each eye, on the side of the head, that is bordered by a black line.
- *Urotheca guentheri* (p. 535) also has an orange venter and dark-bordered white ocelli on the side of the head.

Tropidodipsas sartorii

Least concern

Northern Snail-eater (*Caracolera Norteña*)

A medium-sized terrestrial snake with a small, robust head. Has alternating black and light rings that completely encircle the body; light rings generally white, cream, or yellow, but sometimes orange. Black head cap incorporates eyes and is slightly V-shaped on top of head. Total length to 31.5 in (80 cm).

Tropidodipsas sartorii occurs on the Atlantic slope, from Mexico to northern Honduras; it also occurs on the Pacific slope, in extreme northwestern Costa Rica and adjacent Nicaragua. From near sea level to 6560 ft (2000 m).

Natural history

Historically, *Tropidodipsas* was considered synonymous with the genus *Sibon*, and the slug and snail-eating members of both genera are quite similar in morphology and biology. However, seven species are currently recognized in the genus *Tropidodipsas*. They occur mostly in northern Central America, but one species, *Tropidodipas sartorii*, was recently found in the extreme northwestern lowlands of Costa Rica. It can be common throughout its range, but it is uncommon in Costa Rica.

Mainly terrestrial, *Tropidodipsas sartorii* is often seen as it crosses open areas at night. These nocturnal snakes seek out worms, slugs, snails, and other soft-bodied prey, when temperatures in their arid habitat are down and humidity is up. During the day they can sometimes be found hiding below logs or surface debris.

Tropidodipsas sartorii is aglyphous and non-venomous, and swallows its prey whole.

These snakes are oviparous; clutch sizes of up to five eggs have been reported elsewhere in their range. No information exists on reproduction in Costa Rican populations.

Throughout its range, *Tropidodipsas sartorii* displays a variety of colors, and the light-colored rings that separate the black rings can be white, cream, bright yellow, orange, or red. Orange and red individuals appear most common toward the northern end of its range; Costa Rican individuals tend to be black and white, or black and pale yellow.

Description

Tropidodipsas sartorii invariably has a pattern of alternating black and light rings on its body and tail. Most Costa Rican individuals have white or cream rings (above left). Some have yellow rings (p. 530) or orange rings (above right).

Top of head with nine enlarged, symmetrical plates.

Dentition aglyphous; all maxillary teeth similar in size.

Ventral scales number 165–197; 52–77 paired subcaudals; cloacal scute divided.

Black head cap incorporates eyes, extends backward along the suture of the parietal scales in a V-shape.

Eyes fairly small and non-protuberant; pupils vertically elliptical, iris dark.

Color pattern consists of narrow light (white, cream, pale yellow, or orange) rings separated by wide black rings that completely encircle the body.

17 rows of smooth scales at midbody.

A relatively slender, medium-sized snake with a cylindrical body.

Head small and stocky, barely wider than neck. Snout short and rounded.

Similar species

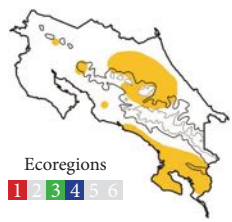
- *Sibon anthracops* (p. 504) has bright orange blotches in each light body ring.
- *Leptodeira nigrofasciata* (p. 470) has a longer, slender snout; its dark saddle spots do not continue onto the belly, which is uniform white.
- *Scolecophis atrocinctus* (p. 390) has alternating black and light-colored body rings, but the middorsal area of each light ring is prominently marked with a bright orange blotch.
- *Dipsas articulata* (p. 434) has a distinctly compressed body and usually a pink or reddish middorsal stripe or blotch in each lighter-colored body ring.
- Juvenile *Pliocercus euryzonus* (p. 490) have a black and white ringed pattern; they have a long, angular snout and an exceedingly long tail (sometimes incomplete).
- Juvenile *Oxyrhopus petola* (p. 488) have a pattern of cream and black bands that do not completely encircle the body; starting on the posterior half of the body and tail, orange suffuses into the light bands.

Urotheca decipiens

Least concern

Collared Glasstail (*Cola de Vidrio de Collar*)

Slender and long-tailed (tail often incomplete). Black or dark brown with a thin white stripe on the first dorsal scale row along each side of the body; an additional pair of dorsolateral thin white stripes is usually present. The pale nuchal collar (bright orange or pale brown) disappears with age. Usually has a white lip stripe. Total length to 23.6 (60 cm).



Urotheca decipiens occurs on the Atlantic slope, from southeastern Honduras to western Panama; on the Pacific slope, it is found from central Costa Rica to Colombia. From near sea level to at least 5250 ft (1600 m).

Natural history

This beautiful, slender snake is infrequently found on the forest floor of wet, pristine forests. It is diurnal and actively hunts for prey in the leaf litter; prey consists mostly of small frogs, but may include salamanders, as well as small leaf litter lizards. One individual was found crawling on a large mossy boulder in the middle of a forest stream, likely in pursuit of amphibian prey.

Urotheca decipiens is oviparous and produces clutches of at least three eggs. Little is known about its reproductive biology, but hatchlings have been observed in March and April. The hatching of their eggs possibly coincides with the end of the dry season and the subsequent increase of small amphibian prey at the onset of the wetter months.

This species undergoes considerable ontogenetic color change, and juveniles and adults look quite different. It is not known why the mostly cryptic young develop an increasingly bright and highly visible orange neck band later in life, or why some adults retain the orange nape but others not. It is likely that these pattern elements provide some sort of selective advantage to avoid predators. Like other *Urotheca*, this species has a very long, fragile tail that easily breaks when the snake is restrained by it. The tail has the ability to break multiple times, due to fracture planes in the vertebrae; the tail section continues to move once it is separated, affording the snake time to escape as the predator is distracted by the wriggling tail. The broken tail section does not regenerate, and a significant number of these snakes sports an incomplete tail, testament to the effectiveness of this predator-avoidance strategy.

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 122–140; 90–121 paired subcaudals; cloacal scute divided.

Similar species

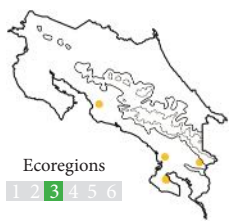
- *Urotheca fulviceps* (p. 533) lacks light longitudinal stripes on its body and tail.
- *Urotheca guentheri* (p. 535) has dark-bordered ocelli on the head and neck and a bright orange venter.
- *Rhadinaea decorata* (p. 494) has dark-bordered ocelli on the head and neck and either a bright orange venter (Atlantic slope) or white venter (Pacific slope).

Urotheca fulviceps

Vulnerable

Red-headed Glasstail (*Cola de Vidrio de Cabeza Roja*)

Slender, with a long tail (often incomplete); body grayish-green, olive-green, or brown; head reddish-brown, with an orange-tinged nuchal collar in younger animals. Light-colored upper lip shields heavily suffused with black pigment, and lowest dorsal scale rows marked with light-colored mottling or dashes. Total length to 25.6 in (65 cm).



Urotheca fulviceps is known from isolated populations in the Pacific lowlands of Costa Rica, in Carara National Park, Rincon and Palmar Norte in southern Puntarenas province, and the Las Alturas region in Coto Brus. It also occurs in the Canal Zone in Panama and south into northern South America (Colombia, Ecuador, and Venezuela). From near sea level to 5,175 ft (1,578 m).

Natural history

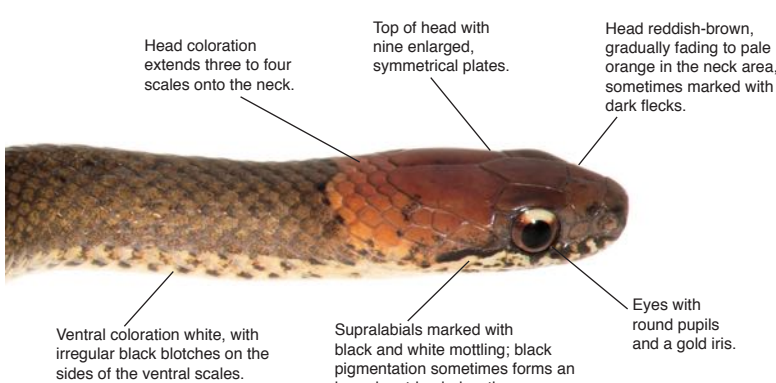
This mostly South American species reaches its northernmost distribution in the lowlands and foothills of Pacific Costa Rica, where it is only rarely seen. This is normally a diurnal species of dense forest interiors, but limited observations indicate that during the hottest, driest months of the year it may switch to a nocturnal activity pattern. *Urotheca fulviceps* inhabits leaf litter on the forest floor, where it hunts for frogs and small lizards.

This species is oviparous, but no further details on its breeding biology are known.

Like other species in its genus, *Urotheca fulviceps* has a long, fragile tail that breaks off easily when grabbed by a predator; individuals sometimes lack a section of the tail.

The genus *Urotheca* is closely allied with the genus *Rhadinaea*, and this species may be referred to as *Rhadinaea fulviceps* in older literature.

Description



Dentition opisthoglyphous; rear maxillary teeth enlarged.

Ventral scales number 136–144; 98–122 paired subcaudals; cloacal scute divided.

Urotheca fulviceps is a beautiful leaf-litter snake. The only other snakes in Costa Rica with a distinctly reddish-brown head and solid-colored body and tail are *Urotheca myersi*, *Urotheca pachyura*, and *Amastridium veliferum*.

Similar species

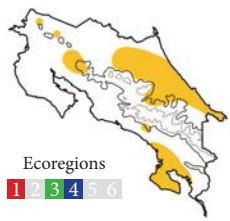
- *Urotheca myersi* (p. 537) has a yellow venter and a pale head cap that only extends 1 or 2 scale rows onto the neck.
- *Urotheca pachyura* (p. 538) has a pale head cap that only extends 1 or 2 scale rows onto the neck. The white supralabials are mostly unmarked.
- *Amastridium veliferum* (p. 418) has a similar coloration but distinctly different head shape with a pronounced, sharp canthal ridge.

Urotheca guentheri

Orange-bellied Glasstail (*Cola de Vidrio Rayada*)

Least concern

Slender, with a long tail (often incomplete); body dark brown, with two pairs of dark-bordered white stripes and two pairs of dark-bordered ocelli on the back of the head and neck. Usually has a white lip stripe. Venter uniform bright orange. Total length to 27.6 in (70 cm).



Urotheca guentheri occurs on the Atlantic slope, from eastern Honduras to western Panama. It occurs on the Pacific slope, in southern Costa Rica and central Panama; it also occurs in isolated populations in the Guanacaste and Tilarán mountain ranges of Costa Rica. From near sea level to 5250 ft (1600 m).

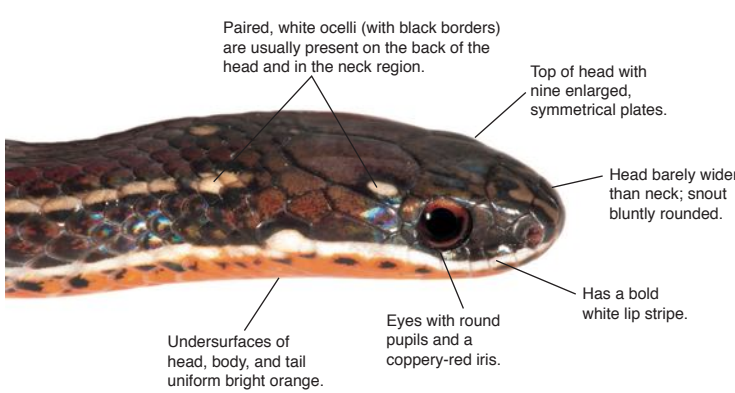
Natural history

An uncommon terrestrial snake of relatively undisturbed, wet forest habitats. *Urotheca guentheri* is a leaf litter inhabitant that hunts for small frogs and possibly lizards during the day. An individual was observed hunting tadpoles from a temporary rain pool in a forest road.

Urotheca guentheri is oviparous, but no additional details on its breeding biology are available. Although this is a rarely encountered snake, there is a March record of three individuals that were found in the same forest clearing, within a few days of one another. The snakes appeared to be a single female and two males, and this sighting may have been triggered by reproductive behavior. The males were possibly attracted to a pheromone trail left behind by the female. If mating does indeed take place toward the end of the dry season, then their eggs would hatch well into the rainy season, which would ensure that amphibian reproduction is in full swing and ample small amphibian prey would be available to juvenile *Urotheca guentheri*.

Like other *Urotheca*, many individuals of this species are missing a section of their tail. The long, fragile tail in *Urotheca guentheri* breaks readily when restrained or grabbed by a predator. The detached tail section will continue to wriggle for a few minutes and distract a predator while the snake escapes to safety. Snakes' tails do not regenerate.

Description



Description

Ventral scales number 135–176; 82–110 paired subcaudals; cloacal scute divided.

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Note incomplete tail.

Slender, medium-sized snake with a cylindrical body and a long tail, which is often incomplete.

Body and tail marked with two black-bordered light lateral stripes; the top stripe usually has a cream to tan hue, while the lower stripe tends to be white.

17 rows of smooth scales at midbody.

In some older individuals, the dorsal coloration can darken to nearly black, and the lateral stripes become less pronounced.

Dorsum is deep chestnut-brown, marked with a dark middorsal line.

When the orange ventral coloration is not visible, *Urotheca guentheri* resembles several other obscure, brown leaf litter snakes in the country (e.g., *Rhadinaea decorata*).

Similar species

- *Urotheca decipiens* (p. 531) lacks dark-bordered ocelli on the head and neck and has a white venter.
- *Urotheca fulviceps* (p. 533) lacks light longitudinal stripes on its body and tail.
- *Rhadinaea decorata* (p. 494) lacks paired dorsolateral light stripes.

Urotheca myersi

Least concern

Myers' Glasstail (*Cola de Vidrio Panameña*)

Slender, with a long tail (often incomplete); body and tail uniform brown, head distinctly lighter in coloration. Light head cap extends 1 or 2 scales onto the neck, and is bordered by a thin black line. Venter uniform bright yellow. Total length to 13.8 in (35 cm).

Urotheca myersi is endemic to Costa Rica. It has only been found in few locations on the Pacific slope of the Talamanca Mountain Range; 4920–7400 ft (1500–2255 m). It likely also occurs in adjacent western Panama.

Natural history

This rare species is only known from a handful of individuals found in the Perez Zeledón region and on the southern slopes of Mount Chirripó; one individual was found in the Las Tablas region near the border with Panama, indicating that *Urotheca myersi* may occur throughout the intermediate elevation zone of the southern Talamanca Mountain Range. As far as is known, there have been no observations of this species since 1990.

Presumably, its biology is similar to that of related species in the genus *Urotheca*, and it is likely an inhabitant of the leaf litter layer in relatively undisturbed forests. *Urotheca myersi* is diurnal and probably feeds on small leaf-litter amphibians, and possibly reptiles. It is thought to be oviparous.

A significant decline in middle elevation and highland amphibian populations since the late 1980s may have negatively impacted this species.

Description

- 17 rows of smooth scales at midbody.
- Top of head with nine enlarged, symmetrical plates.
- Ventral scales number 132–138; 119–123 paired subcaudals; cloacal scute undivided.
- Dentition opisthoglyphous; rear maxillary teeth enlarged.
- A slender, medium-sized snake with a cylindrical body and a long tail.
- Head only slightly wider than neck.
- Head rufous or orange-red; lighter in color than body and tail.
- Head coloration extends 1 or 2 scale rows onto the neck; nuchal collar bordered posteriorly by a narrow black band.
- Eyes with round pupil; snout bluntly rounded.
- Venter bright yellow; dark dorsal coloration extends somewhat onto ventral and subcaudal scales.
- Labial scales light, sparsely marked with brown blotches.

Similar species

- *Urotheca fulviceps* (p. 533) has a light head cap that extends 3 or 4 scale rows onto the neck and a white or cream venter.
- *Urotheca pachyura* (p. 538) has a white venter and a distinct series of white dashes on the lowest dorsal scale rows on either side of the body.

Urotheca pachyura

Least concern

Costa Rican Glasstail (*Cola de Vidrio Costarricense*)

Slender and with a long tail (often incomplete); body and tail olive-green to brown, with a white line or series of white spots on the lowest dorsal scale row on each side of the body. Head cap is brown; cap extends 1 or 2 scale rows onto neck. Supralabial area light-colored, without black pigment. Total length to 27.6 in (70 cm).

Urotheca pachyura occurs on the Atlantic slope, in Nicaragua, Costa Rica, and western Panama; near sea level to 4460 ft (1360 m).

Natural history

This diurnal leaf litter snake is poorly known. It likely feeds on small amphibians, and perhaps small lizards. This is an alert, visually oriented hunter; limited observations of this species showed that these snakes are active mid-morning and in late afternoon. *Urotheca pachyura* is only found in in the shaded interior of undisturbed forest habitats.

Other members of its genus are oviparous, and the same is likely true of *Urotheca pachyura*, although no details are available.

This species was previously placed in the related genus *Rhadinaea* and is listed in some older literature as *Rhadinaea pachyura*. Members of both genera are capable of breaking off sections of the tail to escape predation, and *Urotheca pachyura* has a very long, fragile tail that is regularly missing a terminal section. Unlike in lizards, snake tails do not regenerate when lost.

Description

Dentition opisthoglyphous; rear maxillary teeth enlarged.

Head cap uniform reddish-brown to pale brown; cap extends 1 or 2 scale rows onto the neck.

Ventral scales number 130–138; 104–124 paired subcaudals; cloacal scute divided.

Top of head with nine enlarged, symmetrical plates.

Eyes with round pupils and a red iris.

Dorsum uniform dark greenish-gray, olive, or grayish-brown; usually with significant black mottling on the dorsal scales.

Supralabial scales cream or white, immaculate or with only minimal dark speckling.

Medium-sized and slender, with a cylindrical body and a long tail (often incomplete).

First row of dorsal scales on each side of the body marked with a light (white or cream) stripe, or a linear series of light spots.

In some older individuals, dorsal and head coloration may become nearly uniformly dark grayish-brown.

Ventral surfaces white, cream, or pale yellow; edges of ventral scales marked with irregular dark brown blotches.

17 rows of smooth scales at midbody.

Pale nuchal collar present in juveniles; darkens in older individuals.

Head only slightly wider than neck.

Similar species

- *Urotheca decipiens* (p. 531) has two pairs of thin white lines on the body and tail; it often has a bright orange nuchal collar.
- *Urotheca fulviceps* (p. 533) has a light head cap that extends 3 or 4 scale rows onto the neck; it also has darkly mottled supralabial scales.
- *Urotheca myersi* (p. 537) has a bright yellow venter.

Xenodon rabdocephalus

Least concern

False Fer-de-Lance (*Falsa Terciopelo*)

A relatively heavy-bodied, stocky snake with a short tail and a distinctly triangular head; viperlike in general appearance but distinguished by its round pupils and the absence of heat-sensitive loreal pits. Total length to 39 in (102 cm).

Xenodon rabdocephalus ranges from Guerrero and Veracruz, Mexico, south through Central America and into northern Colombia; from near sea level to 3935 ft (1200 m).

Natural history

Xenodon rabdocephalus is a terrestrial species of forests, fields, and scrubland. Although it is quite adaptable to habitat change, it tends to be found near wetlands, streams, rivers, and other areas where its amphibian prey abounds. This is a dietary specialist that only feed on toads, frogs, and their tadpoles. When facing predators, many frogs and toads inflate their body, attempting to increase their girth beyond the gape size of their potential predator. *Xenodon rabdocephalus* grabs amphibians and uses its greatly enlarged rear fangs to pierce the body cavity and lungs of its prey and deflate them. These snakes appear to be immune to amphibian skin toxins.

When cornered, *Xenodon rabdocephalus* will flatten its head and body, hiss loudly, gape, and strike. It can rotate its flexible upper jaw to the point that the enlarged fangs in the back of the mouth protrude from the corner of the mouth. These snakes readily bite when threatened and can cause painful lacerations. In addition, *Xenodon rabdocephalus* is mildly venomous, and bites can also cause localized swelling and profuse bleeding in humans.

The stocky body shape, cryptic color pattern, and erratic defensive behavior make these snakes look convincingly like a dangerously venomous fer-de-lance (*Bothrops asper*). However *Xenodon rabdocephalus* lacks the heat-sensitive pits typically seen in pitvipers, and it has round pupils and smooth scales covering its body.

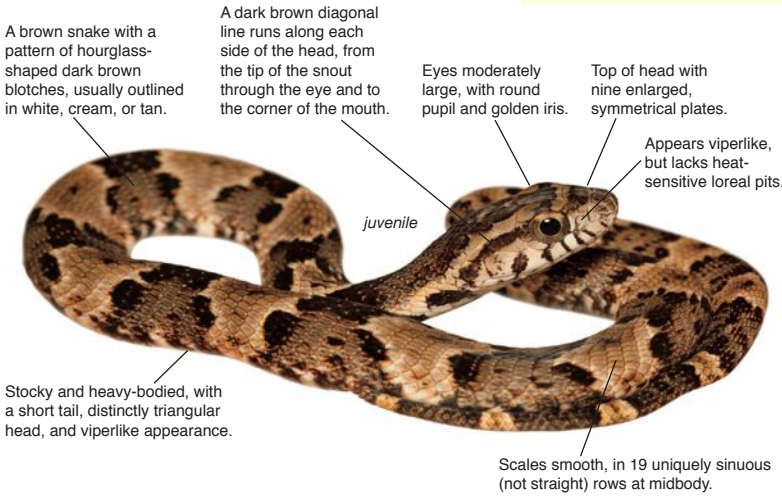
Xenodon rabdocephalus is oviparous and may produce clutches containing up to 15 eggs. Limited observations suggest that oviposition may take place year-round in areas with a high annual rainfall, but hatching of young snakes is likely synchronized with the breeding season of local amphibians to ensure sufficient prey.

In a 2014 study, the name *Xenodon angustirostris* was tentatively resurrected for populations that occupy Central America and western Colombia. They apparently differ from South American populations in their hemipenis morphology, and future studies may formalize this tentative arrangement.

Description

Dentition opisthoglyphous; rear maxillary teeth greatly enlarged.

Ventral scales number 138–151; 44–48 paired subcaudals; cloacal scute undivided.



In a defensive posture, these snakes sometimes flatten and spread their neck in a cobra-like fashion.

Similar species

- *Bothrops asper* (p. 587) has loreal pits, vertically elliptical pupils, and lacks symmetrical, enlarged plates on the top of its head.
- *Drymobius rhombifer* (p. 355) has keeled scales that are not arranged in oblique, sinuous rows.
- *Leptodeira rhombifera* (p. 472) has vertically elliptical pupils.
- *Trimorphodon quadruplex* (p. 414) has a much higher dorsal scale row count (usually 25), and has vertically elliptical pupils.

Family Natricidae
(Water Snakes)

This family (sometimes considered a subfamily within the family Colubridae) contains about 238 species. It is widely distributed throughout Eurasia, Africa, and North America, and also includes a single species that reaches Australia. In the Americas, this family includes the familiar watersnakes (genus *Nerodia)* and gartersnakes (genus *Thamnophis*). The two species of *Thamnophis* found in Costa Rica represent the southernmost occurrences of this family in the New World.

New World members of the family Natricidae tend to be semi-aquatic and feed on fish and amphibians; typically, they are live-bearing and have prominently keeled body scales.

Members of this family are technically not venomous and lack a specialized venom delivery system. Nevertheless, bites by a few North American gartersnake species have in rare cases resulted in localized symptoms that could be ascribed to chemically active compounds in the saliva. Bites by these species are quite common because many people handle these harmless snakes; generally, such bites occur without noticeable results. However, bites by two Asian species in this family (*Rhabdophis tigrinus* and *Rhabdophis subminiatus*) have caused significant haemorrhagic effects in humans and have led to fatalities. Even though they lack specialized venom delivery systems or venom glands, some people may be especially sensitive to the chemicals that these snakes produce. As far as is currently known, both Costa Rican species of *Thamnophis* are completely harmless.

Thamnophis marcianus

Least concern

Checkered Garter Snake (*Culebra Aquática Cuadriculada*)

Fairly robust, with distinctly keeled dorsal scales. Dorsum grayish-brown to reddish-brown, with a faint middorsal pale stripe and an irregular checkerboard pattern of black squares. Lip shields light-colored, with black pigment along the sutures; ventral scales with thin black transverse bars. Total length to 39.4 in (100 cm).

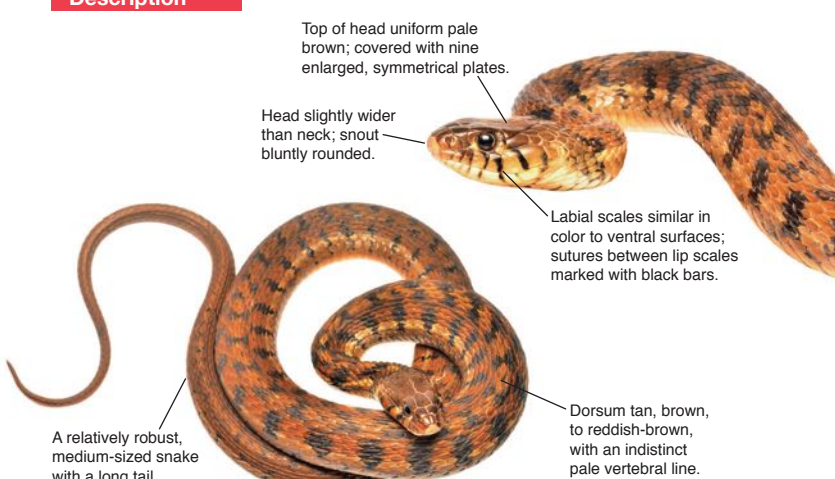
Thamnophis marcianus is common in the southwestern US and in northern Mexico. It occurs in isolated localities throughout the Atlantic slope of Central America, as far south as southeastern Costa Rica; from near sea level to 100 ft (30 m).

Natural history

This is a terrestrial, diurnal species that is invariably associated with different wetland types such as streams, marshes, and ponds. It readily takes to the water and is an adept swimmer. Individuals are usually found basking in vegetation along the water's edge, or hunting for prey. Preferred food items mostly include species that are also found in, or near, water: fish, frogs, tadpoles, slugs, leeches, and worms. Prey is generally captured and swallowed alive. Although *Thamnophis* do not have a specialized venom delivery system or enlarged rear fangs, several observations confirm that some kind of secretions are injected during a bite that can cause itching, local swelling, and profuse bleeding in humans; these secretions likely have an anticoagulatory and/or digestive function when used on prey animals.

Thamnophis marcianus is live-bearing and can deliver up to 30 offspring in the northern end of its distribution range. It is unclear whether litter sizes in Costa Rican populations are comparable.

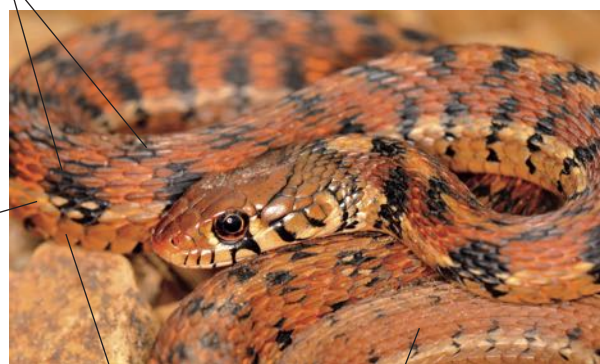
Description



Dentition aglyphous; but maxillary teeth vary in size.

Ventral scales number 138–148; 68–79 paired subcaudals; cloacal scute undivided.

A row of black vertical bars or squarish marks on each side of the body, and a third row on the middle of the dorsum.



A pale lateral line is present on scale rows 2 and 3 on either side of the body.

Ventral coloration yellowish-brown to tan, extending upward onto the lower sides and reaching the lateral pale line. Ventral scales with transverse black bars or black spots.

19 rows of strongly keeled scales at midbody.

Similar species

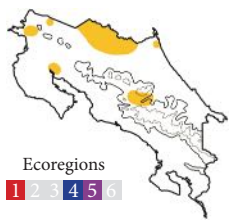
- *Erythrolamprus epinephelus* (p. 444) has a pattern of alternating squarish orange and black bars, but has smooth dorsal scales.
- *Thamnophis proximus* (p. 545) also has 19 rows of keeled dorsal scales, but lacks black transverse stripes on its ventral scales; it has a striped dorsal pattern and uniform golden-orange labial scales.
- Juvenile *Mastigodryas melanolomus* (p. 376) have a checkerboard pattern of alternating dark and light blotches but have smooth scales.

Thamnophis proximus

Least concern

Neotropical Ribbon Snake (*Culebra Aquática de Cinta*)

Slender, with distinctly keeled dorsal scales. The combination of a light middorsal stripe, paired light dots on top of the head, a light lateral stripe on scale rows 3 and 4, and golden-orange labial scales is unique among Costa Rican snakes. Total length to 47.2 in (120 cm), but generally considerably smaller.



Thamnophis proximus is a very widespread snake. It occurs throughout the northern and southeastern US and is found on the Atlantic slope of Central America as far south as central Costa Rica. In Costa Rica, this species has been found locally in the northwestern and northeastern lowlands, as well as in the Central Valley; from near sea level to at least 5740 ft (1750 m).

Natural history

Thamnophis proximus reaches its southernmost distribution in Costa Rica. Although it is well-known in the northern part of it range, there is little information available for Costa Rican populations. Individuals from populations found in southern Mexico, and farther south, are generally attributed to the subspecies *Thamnophis proximus rutiloris*, sometimes called the Mexican ribbon snake, and are distinguished, in part, by the golden-orange coloration on the upper labial scales.

Thamnophis proximus is terrestrial and semi-aquatic; it is generally found close to streams, ponds, and marshes. These are day-active, fast-moving visual hunters who readily take to the water in pursuit of prey. Food items include fish, tadpoles, frogs and toads, slugs, and worms, which are all swallowed alive. A mildly toxic substance appears to be present in the saliva of these aglyphous snakes, and their bites may cause localized swelling, itching, or excessive bleeding.

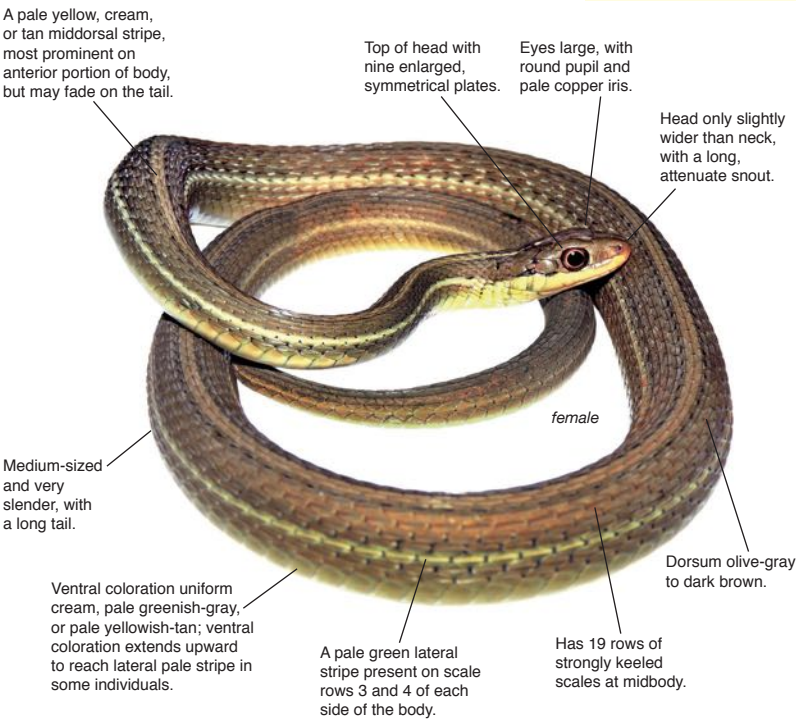
This species is live-bearing, but there is no information on the timing of reproduction or the size of the litters in Costa Rican individuals.

Description

Females are significantly longer and more robust than males.

Dentition aglyphous; but maxillary teeth vary in size.

Ventral scales number 141–164; 82–104 paired subcaudals; cloacal scute undivided.



Similar species

- *Thamnophis marcianus* (p. 543) also has 19 rows of keeled dorsal scales but has a checkerboard pattern on its dorsum; the sutures between its labial scales are marked with black bars.
- Adult *Mastigodryas melanolomus* (p. 376) have a somewhat similar color pattern, but never have a light middorsal stripe or keeled scales.

Family Elapidae
(Coralsnakes and Seasnakes)

Worldwide, this family includes some 365 species of dangerously venomous cobras, mambas, kraits, coralsnakes, and seasnakes. The Americas are home to approximately 80 species of coralsnake and one species of seasnake. Although seasnakes were once assigned to a separate family (Hydrophiidae), they currently are placed in the seasnake subfamily, Hydrophiinae.

Costa Rica is home to one species of seasnake and five species of coralsnake. The yellow-bellied seasnake (*Hydrophis platurus*) is sometimes found stranded on Pacific beaches; it is easily recognized by its flat, oarlike tail and distinct yellow and black (or sometimes all-yellow) coloration. Four of the Costa Rican coralsnakes, Allen's coralsnake (*Micrurus alleni*), Clark's coralsnake (*Micrurus clarki*), Costa Rican coralsnake (*Micrurus mosquitensis*), and the Central American coralsnake (*Micrurus nigrocinctus*), each display a variation on the typical coralsnake theme of red, yellow, and black rings that completely encircle the body. The red rings of these tricolored coralsnakes are invariably bordered on both sides by white, cream, or yellow rings, never by black. The tricolor species can be distinguished from each other by the color pattern on the top of the head, which differs from species to species. The fifth coralsnake species in Costa Rica is the bicolored coralsnake (*Micrurus multifasciatus*), which has a bicolor pattern of black rings alternating with either red, orange, or (rarely) white rings.

Technically, elapids differ from all other snakes in the New World in having a short, hollow, erect fang near the front of the upper jaw. These fangs are permanently erect, as opposed to the fangs in vipers, which are folded back when not in use. When the mouth is closed, the elapids' fangs fit into grooved slots. Each fang contains an enclosed passage that extends the length of the tooth and is connected to a venom gland. There are two venom glands, one located behind each eye. Coralsnakes and seasnakes all have a potent neurotoxic venom, and each Costa Rican elapid snake is capable of inflicting a potentially lethal bite.

Coralsnakes look very similar to their colubrid and dipsadid relatives; snakes of all three groups have a slender body, enlarged and symmetrical head plates, and large, overlapping scales on the body and tail. To further complicate matters, several non-venomous and rear-fanged snakes in Costa Rica, such as *Erythrolamprus mimus* and *Scaphiodontophis annulatus*, have a color pattern that can be very similar to that of venomous coralsnakes.

Snakes of the genus *Micrurus*, to which all Costa Rican coralsnakes belong, typically lack the loreal scale that is situated between the eye and the nostril, and they invariably have 15 scale rows encircling the body. Such characteristics, however, are hard to discern and not very useful in the field. Better features to observe are the shape of the head and the size and color of the eyes. Venomous coralsnakes have a bluntly rounded head that is scarcely wider than the neck. The eyes are small, with a round pupil and an iris that is not discernible when viewed from a safe distance. Most colubrid coralsnake mimics have a more angular head and relatively large eyes with either round or vertically elliptical pupils. Frequently, the mimic's iris is distinctly visible, and is brown, copper, or gold. Another noteworthy feature is the coloration of the head and tail in true coralsnakes, which have only two colors (black and either yellow or cream), while their bodies are tricolored. Most mimics tend to have a tricolor pattern throughout, on the head, body, and tail.

Distinguishing true coralsnakes from their look-alikes can be challenging, especially under low light conditions in a forest interior. One should never attempt to handle or catch coralsnakes, or any snake resembling one; the bite of any coralsnake is potentially life-threatening.

Micrurus alleni

Least concern

Allen's Coralsnake (*Coral Gigante de Agua*)

A venomous coralsnake with a cylindrical slender body, rounded head, and tiny black eyes. Body with tricolored (red, black, yellow) rings; head and very short tail are bicolored (yellow and black). Red body rings bordered on both sides by yellow. Yellow band across top of head not straight-edged; black head cap covers top of snout and extends backward along the suture between the parietal scales. Total length to 52 in (132 cm), but generally significantly smaller.

Micrurus alleni occurs on the Atlantic slope in extreme southeastern Honduras, Nicaragua, and Costa Rica; on the Pacific slope it is found in Costa Rica and adjacent western Panama. From near sea level to 5250 ft (1600 m).

Natural history

A locally common, tricolored coralsnake that inhabits the forest floor of relatively undisturbed rainforest; it is most frequently found in association with forested swamps, wooded stream corridors, and seasonally flooded areas near rivers and streams. This habitat choice is likely explained by its apparent preference for marbled swamp eels (*Synbranchus marmoratus*) as prey. *Micrurus alleni* is known to feed on these eel-like fish, as well as on caecilians (including the exceedingly rare Osa caecilian, *Oscaecilia osae*), snakes, and possibly slender lizards. Prey is killed with a strong neurotoxin, and bites by this species should be considered potentially very dangerous.

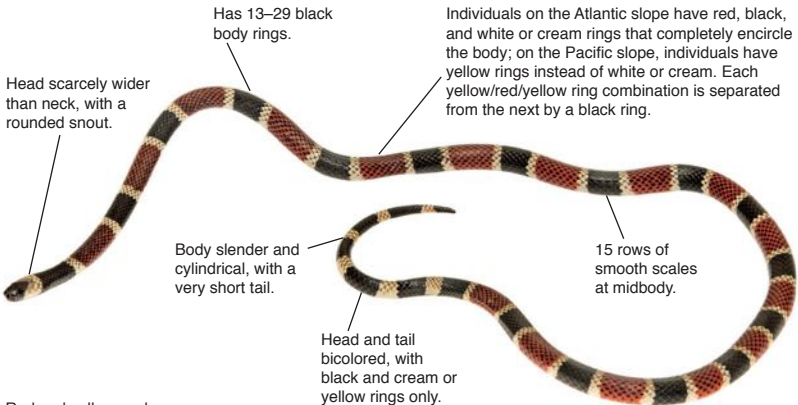
Micrurus alleni is oviparous and can produce clutches containing up to 20 eggs, although average clutch size is considerably smaller. Eggs have been discovered during the dry season (February through April), and hatchlings appear at the onset of the rainy season (May and June).

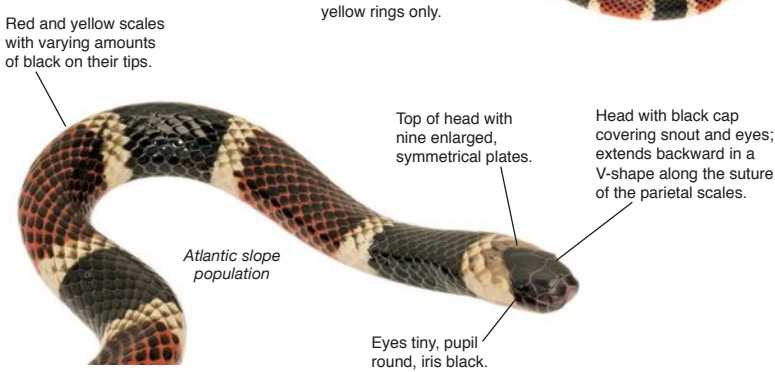
Historically, this species was considered a subspecies of *Micrurus nigrocinctus*, which it closely resembles. *Micrurus alleni,* however, is a valid species, one that itself may consist of two different species. There are significant differences between Atlantic and Pacific slope populations. Most obvious is the color difference in the light-colored body rings, which are yellow in Pacific slope *Micrurus alleni*, as well as in individuals from extreme southeastern Costa Rica and neighboring Bocas del Toro, Panama; these rings are white or cream in most Atlantic slope populations. In addition, individuals in Pacific slope populations often darken with age, and the red scales are increasingly suffused with black pigment as the snakes get older. In some populations, older individuals may appear bicolored, with only black and yellow rings visible dorsally, even though the tricolor pattern remains visible on the venter. Atlantic slope individuals usually have a black spot on each red scale, but this feature does not change with age.

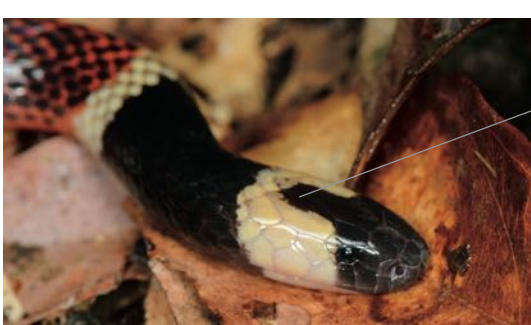
Considerable variation exists in the shape of the black head cap; it may vary from a V-shaped margin and a thin black stripe that marks the margin between the two parietal scales, a pattern usually seen in Atlantic slope populations, to extensive black markings on the top of the head, resembling the extended black head cap of *Micrurus clarki*. The latter condition is seen in some Pacific slope populations. Finally, in Atlantic slope populations the black nuchal ring extends farther back (7–11 scale rows) than in Pacific slope populations (5–8 scale rows).

Some authors apply the tentative subspecies designations of *Micrurus alleni alleni* and *Micrurus alleni yatesi* to the Atlantic and Pacific slope populations, respectively. If these two morphologically unique forms are treated as separate species in the future, the name *Micrurus alleni* will remain with Atlantic slope populations only, whereas Pacific slope individuals will be assigned the name *Micrurus yatesi*.

Description







DANGEROUSLY VENOMOUS! Dentition proteroglyphous; has hollow, immobile fangs in the front of the mouth for injecting venom.

Ventral scales number 205–244; 32–60 paired subcaudals; cloacal scute divided.

Micrurus alleni from Pacific slope populations and those from extreme southeastern Costa Rica tend to have deep yellow rings instead of cream rings.

Large individuals from Pacific slope populations can develop extensive dark pigmentation in their red rings, and sometimes appear bicolored; the red rings can be almost completely obscured by black pigment (the tricolored pattern is usually still visible on the venter).

Similar species

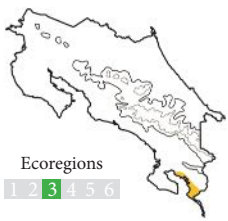
- *Micrurus nigrocinctus* (p. 559) has a straight-edged head cap, a short first black body ring (extends backward 4–8 scale rows), 9–22 wide black body rings, and white-colored rings. Its red body rings often darken with age (may be completely black in some large individuals).
- *Micrurus mosquitensis* (p. 554) has a straight-edged head cap, a very long first black body ring that extends backward 9–14 scale rows, and 9–14 wide black and broad yellow body rings. Its red body rings do not become suffused with black pigment over time (although a black spot is generally present on each scale).
- *Micrurus clarki* (p. 552) has a relatively broad head, and its black head cap completely incorporates the large parietal scales; it has 13–20 black body rings.
- *Scaphiodontophis annulatus* (p. 388) has a very long tail (which is often incomplete) and large bronze-colored eyes with a clearly visible round pupil; its color pattern is often offset along the mid-dorsal line, so the coralsnake-like color pattern is not perfect.
- *Erythrolamprus mimus* (p. 446) has each red ring bordered by a light-colored one, but each black ring is partly bisected by a middorsal white blotch (most prominently in large adults).
- *Erythrolamprus bizona* (p. 442) has a double black ring in the neck region, separated by a narrow light band.
- *Lampropeltis micropholis* (p. 359) and *Lampropeltis abnorma* (p. 357) have a color pattern of red rings that are bordered on each side by black rings, rather than light-colored ones.

Micrurus clarki

Least concern

Clark's Coralsnake (*Coral de Labios Manchados*)

A venomous coralsnake with a cylindrical slender body, rounded head, and tiny black eyes. Body with tricolored (red, black, yellow) rings; head and very short tail bicolored (yellow and black). Red body rings bordered on both sides by yellow; black head cap covers top of snout and completely covers parietal scales; light-colored scales on side of the head often bordered by black pigment. Total length to 36.2 in (92 cm).



Micrurus clarki occurs on the Atlantic slope, from eastern Panama to western Colombia; on the Pacific slope, there is an isolated population in extreme southwestern Costa Rica and adjacent western Panama. From near sea level to 1640 ft (500 m).

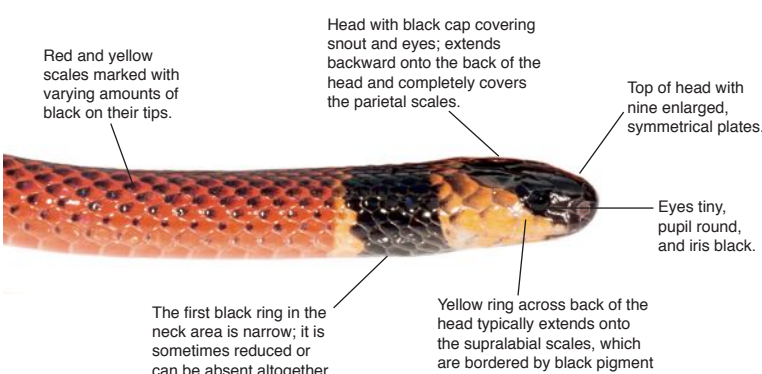
Natural history

Micrurus clarki is a rare species in Costa Rica, with a limited distribution range. It is an inhabitant of relatively undisturbed rainforest habitat, where it is found on the ground, under cover objects, or underground in insect burrows. The natural history of this species is poorly known. Apparently it is nocturnal and feeds on other terrestrial snakes, although marbled swamp eels (*Synbranchus marmoratus*), a fish species with a snake-like body, have also been recorded as part of its diet.

Prey is detected using chemical cues and seized with a quick strike. This coralsnake will bite and hold on to its prey, slowly chewing more venom into its victim. Like other species in its genus, *Micrurus clarki* has a strong neurotoxic venom that quickly causes paralysis. Although the effects of the venom on humans is not known for Costa Rican populations, a fatality involving this species has been reported from Colombia.

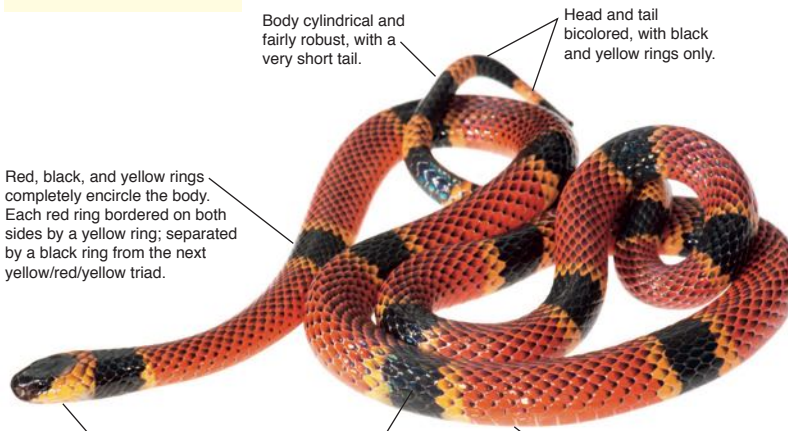
Micrurus clarki is oviparous, but no other information exists on the breeding biology of Costa Rican populations.

Description



DANGEROUSLY VENOMOUS!
Dentition proteroglyphous; has hollow, immobile fangs in the front of mouth for injecting venom.

Ventral scales number 190–221; 34–58 paired subcaudals; cloacal scute divided.



Similar species

- *Micrurus nigrocinctus* (p. 559) has a straight-edged head cap, a short first black body ring (extends backward 4–8 scale rows), 9–22 wide black body rings, and white-colored rings. Its red body rings often darken with age (may be completely black in some large individuals).
- *Micrurus mosquitensis* (p. 554) has a straight-edged head cap, a very long first black body ring that extends backward 9–14 scale rows, and 9–14 wide black and broad yellow body rings. Its red body rings do not become suffused with black pigment over time (although a black spot is generally present on each scale).
- *Micrurus alleni* (p. 549) has a black head cap that extends backward along the center margin of the two parietal scales; it has 13–29 black body rings.
- *Scaphiodontophis annulatus* (p. 388) has a very long tail (which is often incomplete) and large bronze-colored eyes with a clearly visible round pupil; its color pattern is often offset along the mid-dorsal line, so the coralsnake-like color pattern is not perfect.
- On *Erythrolamprus mimus* (p. 446), each red ring is bordered by a light-colored one, but each black ring is partly bisected by a middorsal white blotch (particularly in large adults).
- *Erythrolamprus bizona* (p. 442) has a double black ring in the neck region, separated by a light-colored ring.
- *Lampropeltis micropholis* (p. 359) and *Lampropeltis abnorma* (p. 357) have a color pattern of red rings that are bordered on each side by black rings, rather than light-colored ones.

Micrurus mosquitensis

Least concern

Costa Rican Coralsnake (*Coral Costarricense*)

A venomous coralsnake with cylindrical slender body, rounded head, and tiny black eyes. Body has tricolored (red, black, yellow) rings; head and very short tail are bicolored (yellow and black). Red body rings bordered on both sides by yellow; yellow band on head straight-edged; has 9–14 broad black rings on body. Total length to 39.4 in (100 cm), but generally smaller.

Micrurus mosquitensis inhabits the Atlantic lowlands and foothills of Nicaragua, Costa Rica, and Panama; from near sea level to 4920 ft (1500 m).

Natural history

This poorly defined species was long considered to be a subspecies of *Micrurus nigrocinctus*, which it closely resembles. In Costa Rica, both species are geographically isolated and show consistently divergent morphological features. In addition, laboratory studies have indicated chromosomal differences, as well as differences in venom composition. Atlantic slope tricolored (red-yellow-black) coralsnakes in Costa Rica are either *Micrurus mosquitensis* or *Micrurus alleni*; both can be distinguished most easily based on the shape of their black head cap (straight-edged in *mosquitensis*, extending backward along the suture of the parietal scales in *alleni*).

Micrurus mosquitensis is a common species of forest interiors generally found on the forest floor of undisturbed wet forests. It is terrestrial and fossorial, and individuals have been found inside insect burrows or underneath tree roots in pursuit of prey. Like other coralsnakes, *Micrurus mosquitensis* feeds almost exclusively on other snakes, although caecilians and slender lizards such as skinks, may

Coralsnakes feed primarily on other snakes. Here a *Micrurus mosquitensis* is starting to swallow a recently killed *Ninia sebae*.

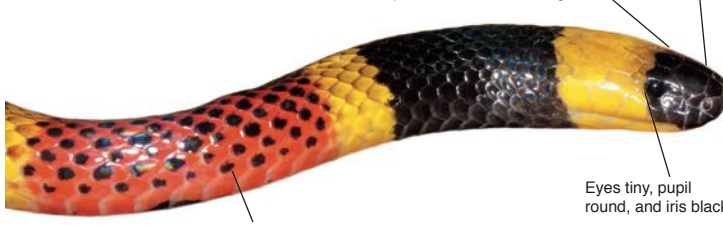
be taken opportunistically. Most of the snakes preyed upon by these coralsnakes are smaller leaf litter or fossorial species such as *Coniophanes fissidens*, *Geophis* species, *Rhadinaea decorata* or *Tantilla* species; even other *Micrurus mosquitensis* may be consumed, and these snakes are not immune to their own venom.

When encountered in the forest, these brightly colored snakes can be surprisingly difficult to see under the prevailing low light conditions on the forest floor. If only part of their body is visible through a gap in the leaf litter or vegetation, the steady procession of colored body rings, when seen through a small opening, makes it difficult to detect in which direction the snake is moving. If caught out in the open, these snakes will freeze in place with the head hidden beneath a body coil, while presenting the black and yellow tail to the predator; often the tail is raised off the ground with the tip curled to resemble a fake head. When touched, the snake will erratically and violently twitch its body and resume another, similar position with the head hidden and the tail prominently displayed. The erratic body thrashing may sometimes completely displace the snake. Interestingly, under low light conditions, the individual colors of the red, yellow, and black bands may be difficult to discern when the snake moves quickly, or thrashes about; these colors blur to appear brown when the snake moves, making it temporarily invisible against the brown leaf litter substrate. This sudden transition from a stationary brightly colored snake to a fast-moving cryptic animal is likely a highly specific antipredator behavior. When escape becomes impossible, *Micrurus mosquitensis* will not hesitate to bite. The strong neurotoxins found in Costa Rican coralsnakes can be potentially life threatening, and any bites should be treated as a medical emergency.

Micrurus mosquitensis is oviparous; clutches of up to 23 eggs have been reported. Eggs have been found at the onset of the rainy season (March trough June), and take about two months to hatch.

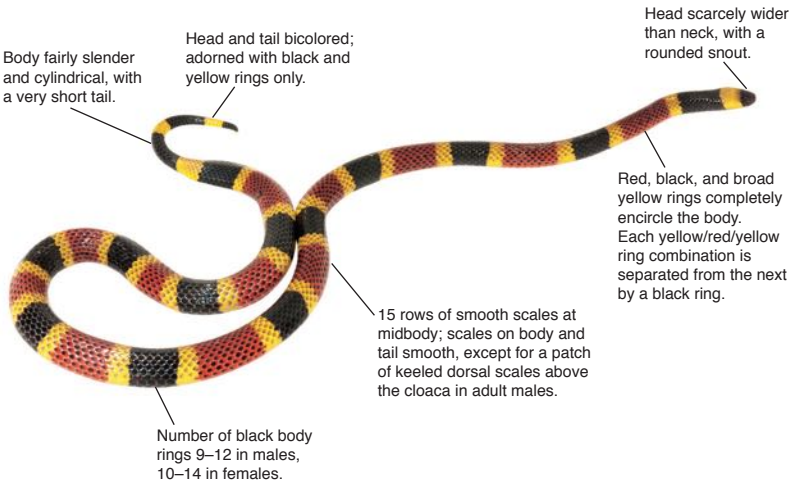
The broad yellow rings and bold red rings (with limited black pigmentation) make *Micrurus mosquitensis* one of the most boldly colored coralsnakes in the country.

Description



Ventral scales number 185–210; 32–49; cloacal scute divided.

DANGEROUSLY VENOMOUS! Dentition proteroglyphous; has hollow, immobile fangs in the front of mouth to inject venom.



Similar species

- *Micrurus nigrocinctus* (p. 559) has a straight-edged head cap, a short first black body ring (extends backward 4–8 scale rows), and more (9–22) wide black body rings; its light-colored rings are narrow and white or cream, and its red body rings often darken with age (may be completely black in some large individuals).
- *Micrurus alleni* (p. 549) has a black head cap that extends backward along the center margin of the two parietal scales; it has 13–29 black body rings.
- *Micrurus clarki* (p. 552) has a relatively broad head, and its black head cap completely incorporates the large parietal scales; it has 13–20 black body rings.
- *Scaphiodontophis annulatus* (p. 388) has a very long tail (which is often incomplete) and large bronze-colored eyes with a clearly visible round pupil; its color pattern is often offset along the mid-dorsal line, so the coralsnake-like color pattern is not perfect.
- On *Erythrolamprus mimus* (p. 446), each red ring is bordered by a light-colored one, but each black ring is partly bisected by a middorsal white blotch (particularly in large adults).
- *Erythrolamprus bizona* (p. 442) has a double black ring in the neck region, separated by a narrow light-colored ring.
- *Lampropeltis micropholis* (p. 359) and *Lampropeltis abnorma* (p. 357) have red rings that are bordered on each side by black rings, rather than light-colored ones.

Micrurus multifasciatus

Least concern

Bicolored Coralsnake (*Coral Gargantilla*)

A venomous coralsnake characterized by a cylindrical slender body, rounded head, tiny black eyes, and very short tail; has 40-73 clearly defined, alternating black and orange rings that completely encircle the head, body, and tail. Total length to 47.2 in (120 cm), but most individuals are considerably smaller.

Micrurus multifasciatus occurs on the Atlantic slope, from central Nicaragua to northern Colombia; it is also found on the Pacific slope in eastern Panama. From near sea level to approximately 3935 ft (1200 m).

Natural history

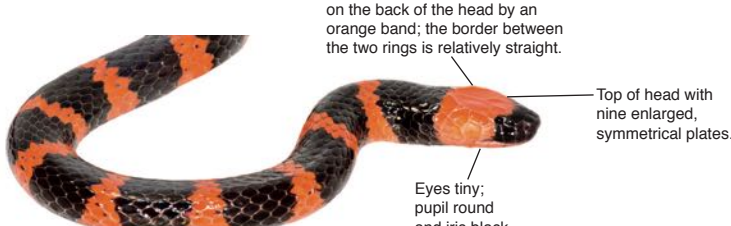
Micrurus multifasciatus is most frequently seen crawling in, and on top of, the leaf litter layer that covers the forest floor. It prefers deeply shaded sections of lowland and premontane wet forest habitat. It is most active at dusk and dawn, when low-light conditions prevail. Individuals are also seen active at night.

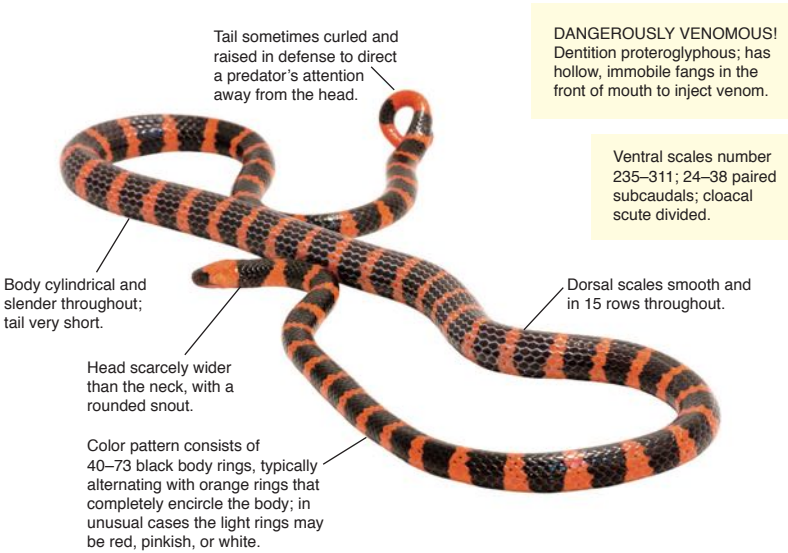
Like other coralsnakes, *Micrurus multifasciatus* predominantly eats other snakes and other elongate reptiles, and individuals spend a considerable amount of time actively searching for potential prey.

Micrurus multifasciatus is a somewhat skittish snake; it moves erratically and is often quick to bite when handled. The venom of these snakes contains powerful nerve toxins, and a bite could result in severe consequences.

The taxonomic status of this species remains poorly understood, and in many publications Costa Rican populations are treated as *Micrurus mipartitus*. *Micrurus mipartitus*, as currently understood, is a species from northern South America that ranges into eastern Panama but does not reach Costa Rica. *Micrurus mipartitus* generally has a pattern of black and white rings on the body, a striking red or orange band across the top of the head, and an orange and black ringed pattern on its tail. Costa Rican *Micrurus multifasciatus* usually have a pattern of orange and black rings throughout, but such individuals may co-occur with individuals that display an entirely black and white color pattern. In some cases, black and white ringed individuals have varying amounts of orange suffusing the light rings. In those animals, the light rings on the head and tail generally appear more intensely orange than the light-colored rings on the body, thus creating a pattern reminiscent of *Micrurus mipartitus*. Some individuals from extreme southeastern Costa Rica certainly look similar to *Micrurus mipartitus*, but in general most Costa Rican *Micrurus multifasciatus* are easily recognized by their brilliant black and orange pattern.

Description





In some populations, primarily outside Costa Rica, individuals can have a pattern of alternating bluish-white and black rings on the body, while the head and tail are marked with orange or red rings. Even more rare are Individuals that are only black and white (left).

Similar species

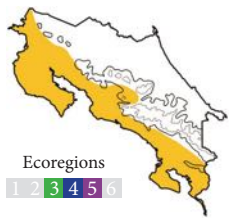
- Other Costa Rican coralsnakes have a tricolored pattern of red, black, and yellow (or white) rings that completely encircle the body, and a pattern of black and yellow rings on the head and tail.
- *Pliocercus euryzonus* (p. 490) has a pattern of black and cream rings that completely encircle the body and tail; the dorsum has light rings suffused with bright orange or red. It has a very long, often incomplete tail.
- *Oxyrhopus petola* (p. 488) has a pattern of black and orange bands (black and cream in juveniles), but note that it has a uniform white venter.
- *Tropidodipsas sartorii* (p. 529) has a pattern of broad black rings separating narrow light-colored rings. Head cap is black and it completely incorporates the eyes; head cap is V-shaped on top of head.

Micrurus nigrocinctus

Least concern

Central American Coralsnake (*Coral Centroamericana*)

A venomous coralsnake characterized by a cylindrical slender body, rounded head, and tiny black eyes. Body marked with red, black, and cream (or white) rings; head and very short tail with pale and black rings only. Red body rings bordered on both sides by cream or white; light band on head is straight-edged. Has 11–22 narrow black rings on body. Total length to 45.3 in (115 cm), but generally smaller.



Micrurus nigrocinctus ranges widely from Mexico to northern Colombia; it also inhabits several Caribbean and Pacific islands. In Costa Rica, it occurs along the Pacific slope and in the Central Valley, from near sea level to 6560 ft (2000 m).

Natural history

Coralsnakes are secretive, burrowing animals that spend most of their time in soil, leaf litter, logs, stumps, or rock crevices. Although infrequently encountered, *Micrurus nigrocinctus* is often common; it can be found in a variety of habitats, ranging from dry, rocky areas to marshes, rainforests, and cultivated fields. Individuals are even found in abandoned, overgrown lots in urban settings in the metropolitan area.

The widespread assumption that coralsnakes are strictly nocturnal is incorrect; individuals of this species have been seen foraging, eating, and mating during the day. *Micrurus nigrocinctus*' diet mainly consists of other snakes, but it occasionally eats caecilians and elongate lizards such as skinks. The rarely encountered Costa Rican blindsnake (*Amerotyphlops costaricensis*) has been retrieved from the stomach of *Micrurus nigrocinctus* on a few occasions in the Monteverde area, and both species must share similar microhabitats there.

Prey is detected with the aid of chemical cues and approached carefully. A sudden movement on the part of prey usually elicits a rapid attack by the coralsnake; but because this snake has poor eyesight, its strikes sometimes miss the mark. When successful, coralsnakes seize their prey and hold on to it in order to chew in the venom. The neurotoxic components of the venom quickly paralyze the prey. As soon as the victim stops moving, it is eaten headfirst. Coralsnakes identify the head of the killed snake by following the arrangement of the overlapping scales on the victim's body. *Micrurus nigrocinctus* is not immune to its own venom and individuals have been observed to succumb to bites by conspecifics or themselves. Coralsnakes have potent neurotoxic venom that can be very dangerous to human; all Costa Rican species can inflict a potentially lethal bite. A noteworthy, common, but erroneous belief among some people in Central America is that only males of this species are venomous, hence its local common name *coral macho*.

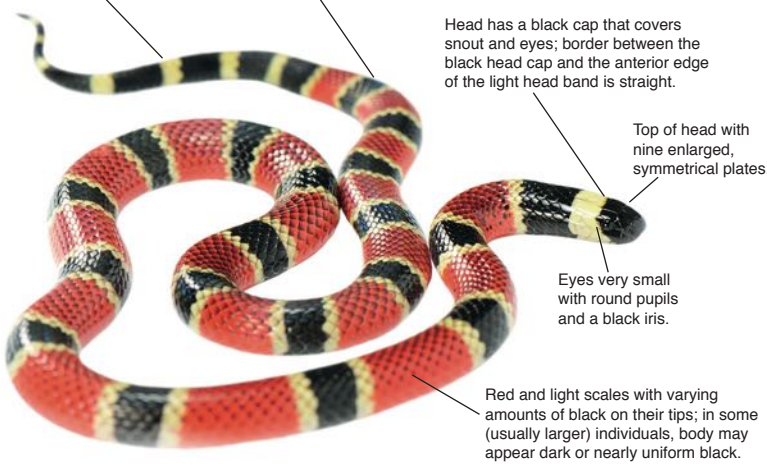
Micrurus nigrocinctus deposits a clutch of up to 15 elongated eggs in leaf litter or in the soil of the forest floor. The eggs hatch after an incubation period of approximately 1.5 to 3 months. Hatchlings have been observed at the beginning of the rainy season, suggesting that the eggs of this species are deposited at the end of the dry season (February through April).

Several tentative subspecies of *Micrurus nigrocinctus* have been described and there is no doubt that distinct geographic races exist locally. The exact delineation of the geographic races is still under debate, however. To complicate matters, intermediate forms are sometimes found between the respective ranges of geographically distinct varieties. Such is the case with *Micrurus nigrocinctus* and *Micrurus mosquitensis*, which are clearly morphologically and geographically distinct in Costa Rica (*Micrurus mosquitensis* inhabits Atlantic slope habitats, while *Micrurus nigrocintus* is mostly a Pacific slope species). Nevertheless, where the ranges of both forms nearly overlap in central Nicaragua, intermediate-looking coralsnakes are found. Despite the confusion, Costa Rican populations of these two forms appear to respresent different species, and the author prefers to treat them as such in this book.

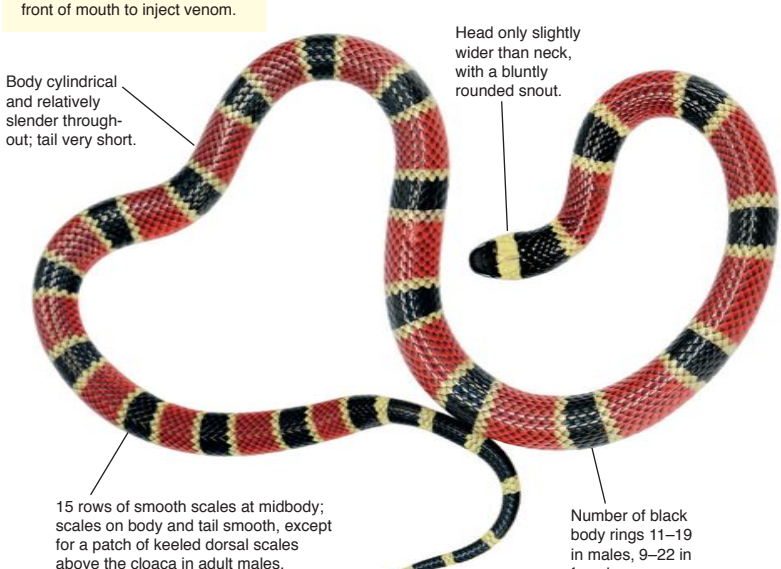
Description

Coloration somewhat variable, especially the color and size of the light rings. Pattern consists of red, black, and relatively narrow, light (white, cream, or pale yellow) rings that completely encircle the body. Each light/red/light ring combination is separated from the next by a black ring.

Ventral scales number 191–224; 31–53 paired subcaudals; cloacal scute divided.



DANGEROUSLY VENOMOUS! Dentition proteroglyphous; has hollow, immobile fangs in the front of mouth to inject venom.



Similar species

- *Micrurus mosquitensis* (p. 554) has a straight-edged head cap, a very long first black body ring (extends backward 9–14 scale rows), and fewer (9–14) wide black body rings. Its light-colored rings are yellow, not white or cream, and its red body rings do not become suffused with black pigment over time (although a black spot is generally present on each scale).
- *Micrurus alleni* (p. 549) has a black head cap that extends backward along the center margin of the two parietal scales; it has 13–29 black body rings.
- *Micrurus clarki* (p. 552) has a relatively broad head, and its black head cap completely incorporates the large parietal scales.
- *Scaphiodontophis annulatus* (p. 388) has a very long tail (which is often incomplete) and large bronze-colored eyes with a clearly visible round pupil; its color pattern is often offset along the middorsal line, so the coralsnake-like color pattern is not perfect.
- *Erythrolamprus mimus* (p. 446) has each red ring bordered by a light-colored one, but each black ring is partly bisected by a middorsal white blotch (most prominent in large adults).
- *Erythrolamprus bizona* (p. 442) has a double black ring in the neck region, separated by a narrow light-colored ring.
- *Lampropeltis micropholis* (p. 359) and *Lampropeltis abnorma* (p. 357) have a color pattern of red rings that are bordered on each side by black rings, rather than light-colored ones.

Hydrophis platurus

Yellow-bellied Seasnake (*Serpiente de Mar*)

Least concern

The only seasnake in Costa Rica; individuals are easily recognized by the oarlike, compressed tail. Usually, the body, top of head, and tail are black; undersurfaces yellow to brown. Total length to 32.7 in (83 cm).

Hydrophis platurus occurs in the Indian and Pacfic oceans. It is found along the Pacific coast from California to Chile. Some authors recognize a distinct, all-yellow subspecies, *Hydrophis platurus xanthos*, which is only found in the Golfo Dulce, in southern Costa Rica.

Natural history

Hydrophis platurus is the most wide-ranging snake species in the world; the southern and northern limits of its distribution are defined mainly by the presence of cold surface waters (lower than 68 °F / 20 °C). On windless days during the dry season, these seasnakes can be found in large numbers floating amid flotsam in slicks, which are narrow regions of calm water where two ocean currents meet. *Hydrophis platurus* can be quite common at times, and the crew of a research vessel reported catching almost 300 individuals within two hours from a 2-mile (3.2-km) slick in the mouth of Costa Rica's Golfo Dulce.

This species is also referred to as "pelagic seasnake," an apt name as it spends its entire life drifting on ocean currents. After storms, individuals sometimes become stranded on beaches, where they usually perish; they lack the muscle strength to crawl back to the water and quickly overheat and dehydrate when exposed to direct sunlight.

Besides breathing through its lungs, this marine snake absorbs a substantial part of the oxygen it needs through its skin. Its unique, hexagonal scales do not overlap, and a well-developed web of blood vessels passes underneath the skin, between the scales. Dissolved oxygen from the water passes through the thin skin and is absorbed by the snake's blood. Normally, active *Hydrophis platurus* surface every 10 to 20 minutes to breathe. Resting animals have been seen submerged for up to 90 minutes; under experimental conditions, individuals were able to stay submerged for over five hours.

Reproduction takes place at sea. The snakes mate while floating near the water surface. After a gestation period of at least five months, up to eight live young are born in the water. Adults and juveniles feed on small fish that congregate below floating debris. Their feeding response is usually triggered by the movement of schools of small fish, which are attracted to the snake's floating body. If fish are immobile or solitary, these snakes show no interest. The eyes are situated on the side of the head for sighting nearby fish, which are caught with a swift, sideways strike.

It is generally thought that the black-and-yellow coloration serves as warning sign. Besides being venomous, the skin and meat of this species appears to be distasteful. In experiments, predatory fish were able to recognize individual *Hydrophis platurus*, and pieces of snake meat were instantly rejected when tasted, even when completely hidden inside a piece of squid. The only confirmed predators of *Hydrophis platurus* are a few bird species, including the common black-hawk (*Buteogallus anthracinus*) and wood stork (*Mycteria americana*).

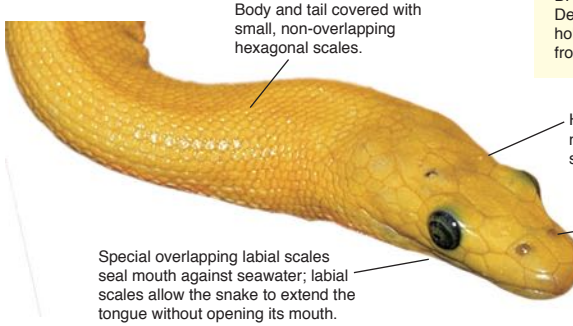
Hydrophis platurus is not an aggressive snake but is reported to bite and lock onto nets or its own body when restrained. The symptoms of *Hydrophis platurus* bites in man are normally relatively mild, and bites are rare. Still, human fatalities have been associated with bites of this species, and individuals caught in nets or found on a beach should be treated with great care since seasnake venom is a very potent nerve toxin. As this species does not normally frequent shallow waters, it poses no substantial threat to swimmers.

This snake was previously known as *Pelamis platurus*, but a relatively recent analysis showed

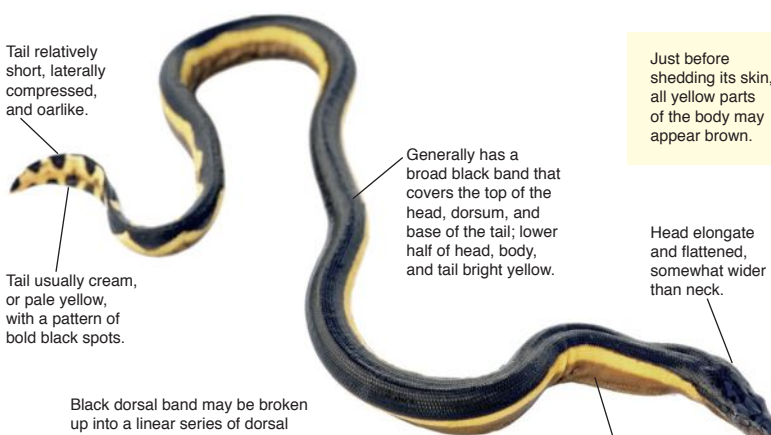
that this species, and genus, shoud be embedded in the larger genus *Hydrophis*, hence the change to *Hydrophis platurus*. An all-yellow color variety of this species occurs in the Golfo Dulce in southwestern Costa Rica, and is considered a separate subspecies, *Hydrophis platurus xanthos*, by some authors.

Description

DANGEROUSLY VENOMOUS! Dentition proteroglyphous; has hollow, immobile fangs in the front of mouth to inject venom.



Just before shedding its skin, all yellow parts of the body may appear brown.



The Golfo Dulce area of southwestern Costa Rica is home to a population of small, all-yellow seasnakes that some consider to be a distinct subspecies, *Hydrophis platurus xanthos*.

Similar species

- Moray eels and other marine eels are sometimes mistaken for seasnakes; eels, which are actually fish, have smooth skin and visible gill covers, and their body is never covered with knoblike, hexagonal scales.

Family Viperidae
(Vipers and Pitvipers)

The viper family includes nearly 350 species that occur worldwide except for Australia and some oceanic islands. All vipers have long, hinged fangs that can penetrate thick fur or several layers of feathers and inject a potent venom deep into a prey's body. When not in use, the fangs rest against the roof of the mouth. Most vipers are heavy-bodied, short-tailed snakes, with a head that appears triangular when seen from above; however, the shape of the body usually depends on whether the snake is terrestrial or arboreal. Arboreal vipers tend to have a more slender, laterally compressed, body and a prehensile tail. The head of nearly all vipers is covered with numerous small scales, in contrast to the symmetrical large head plates of non-venomous rear-fanged snakes and coralsnakes. Most scales on a viper's head, body, and tail are heavily keeled.

The family Viperidae contains three subfamilies: subfamily Azemiopinae, which contains two species of primitive Asian viper; subfamily Crotalinae, or pitvipers; and the Viperinae, the Old World vipers and adders. All viper species in the New World are assigned to the subfamily Crotalinae. In addition to other viper characteristics, the snakes in this subfamily have a deep, pocketlike hole on each side of the head, between the eye and the nostril. These so-called "loreal pits" contain sophisticated infrared receptors that allow the snake to locate and track prey whose body temperature differs from background temperatures.

Their keen senses and extremely potent venom make pitvipers very efficient hunters. For the most part, these snakes are sit-and-wait predators; they stay in the same spot, from a few hours to several weeks, waiting for prey to pass within striking distance. Their excellent camouflage makes them nearly invisible to both prey and predators.

Most potentially dangerous snakebite incidents in the New World tropics are caused by pitvipers; only a fraction are caused by coralsnakes. The venom of pitvipers usually contains hemotoxins, which cause destruction of blood cells and tissues. The venom of some species also appears to contain neurotoxic components that affect the nervous system. Pitviper venom is usually injected in relatively large quantities in comparison with the amount injected by coralsnakes, although sometimes pitvipers bite without injecting venom.

Costa Rica is home to 17 species of pitviper in 8 genera; all can be recognized by the presence of a heat-sensitive loreal pit on each side of the head.

Genus *Agkistrodon*. A single species, *Agkistrodon howardgloydi*, occurs in Costa Rica. This rare relative of North American copperheads and water moccasins differs from other pitvipers in the country by having symmetrical, enlarged plates on top of its head and prominent white stripes that mark the sides of the head.

Genus *Atropoides*. These robust, terrestrial pitvipers are mostly found in foothills and mountains. They have a large, broad head that is bluntly rounded in dorsal and lateral aspect, and a short, non-prehensile tail. Their head and body is covered in very heavily keeled scales, and all scales on the top of the head, except for the narrowly elongated supraoculars, are small and fragmented. There are two species in Costa Rica.

Genus *Bothriechis*. Five species occur in Costa Rica. They are the only pitvipers in the country with a prehensile tail. While all forms are arboreal, these snakes are occasionally found moving on the ground.

Some species are commonly found throughout the lowlands, while others are restricted to high-elevation forests. This genus includes such iconic species as the eyelash palm-pitviper.

Genus *Bothrops*. *Bothrops asper*, the infamous fer-de-lance, or *terciopelo*, is the only member of this genus in Costa Rica. This snake reaches a very large size. Note the velvetlike sheen on its scales and the distinctive pattern of dark triangular blotches on its sides. The narrow tips of these blotches often fuse on the midline and the pale edges of the dark triangles form a series of cream chevron or X-shaped markings when seen from above.

Genus *Cerrophidion*. A single small terrestrial species, *Cerrophidion sasai*, occurs in Costa Rica. It differs from other highland vipers in the country by having the top of its head covered with large, irregularly shaped, unkeeled plates that are surrounded by small keeled scales.

Genus Crotalus. This large genus is represented in Costa Rica by a single species, *Crotalus simus*. It is readily identified by the presence of a rattle on its tail tip.

Genus *Lachesis*. These iconic snakes are among the largest venomous snakes in the world; only the king cobra (*Ophiophagus hannah*) surpasses them in length. Two species of bushmaster are found in Costa Rica. They can be recognized by the heavily keeled, almost pyramidlike, scales that cover the body and tail, and the long, thornlike spike on the tip of the tail. In adults, the middorsal scales are extremely heavily keeled and form an angular distinctly raised ridge. Snakes of the genus *Lachesis* are also unique among Neotropical vipers in that they are oviparous.

Genus *Porthidium*. Four members of this family occur in Costa Rica. These small to medium-sized terrestrial pitvipers differ from other members of the family by having a distinctly upturned snout, which in some species extends into a proboscis-like appendage.

Agkistrodon howardgloydi

Gloyd's Cantil (*Castellana, Cantil*)

Near threatened

The combination of heat-sensitive pits and symmetrical enlarged plates on top of the head is unique. The prominent white stripes on each side of the head (one along the upper lip shields and one passing over top of the eye) are also diagnostic. Total length to 54.3 in (138 cm), although generally smaller.

Agkistrodon howardgloydi is restricted to the dry Pacific lowlands of northwestern Costa Rica, western Nicaragua, and southern Honduras; from near sea level to about 1150 ft (350 m).

Natural history

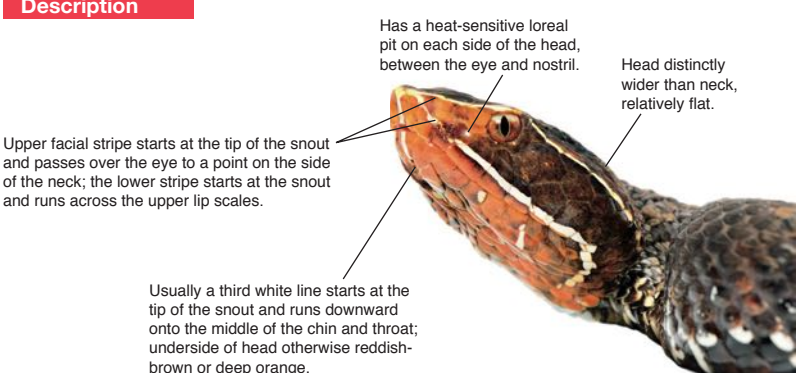
The genus *Agkistrodon* contains eight species in North America and Central America; *Agkistrodon howardgloydi* is its southernmost representative. They characteristically possess the heat-sensitive loreal pits typically seen in the subfamily Crotalinae, but have a colubridlike configuration of large, symmetrical shields on the top of the head.

Agkistrodon howardgloydi inhabits dry savannas, grasslands, and dry tropical forests. In xeric regions, *Agkistrodon howardgloydi* is known to estivate during the driest months. In Santa Rosa National Park, Costa Rica, this species synchronizes the birth of its live young with the beginning of the rainy season, when the preferred prey of juveniles (lizards, frogs, and small mammals) is most abundant. Other known prey items include grasshoppers and snakes. These animals are lured to within striking distance by the brightly colored tail tip of juveniles; the tail tip darkens as the snake ages.

Agkistrodon howardgloydi is terrestrial and most often found in thick leaf litter, where it is difficult to see because of its excellent camouflage. Individuals have also been found under logs. It flattens its body, thrashes its tail sideways, and readily strikes when disturbed. *Agkistrodon howardgloydi* has a relatively strong venom that can cause severe local hemorraging, edema, and necrosis. Bites by this species should be treated as potentially very dangerous; they have resulted in human fatalities.

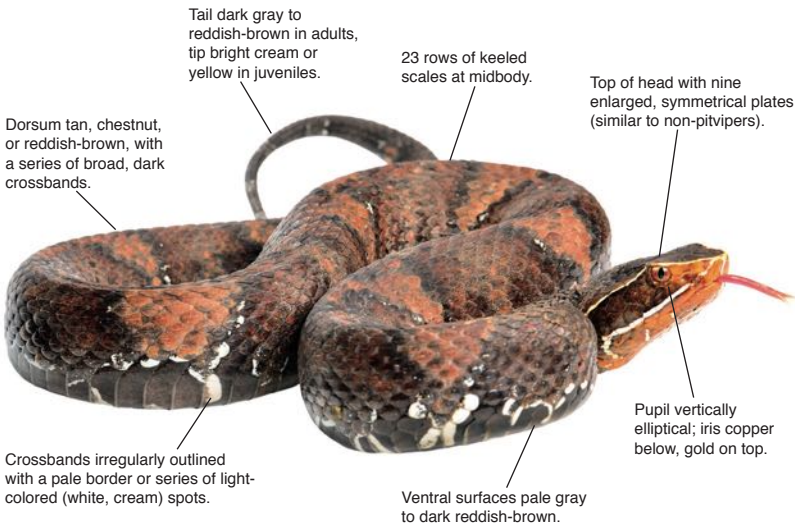
This relatively rare species was formerly known as *Agkistrodon bilineatus.*

Description



DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth are used to inject venom.

Ventral scales number 129–144; 50–68 paired subcaudals; cloacal scute undivided.



A heavy-bodied pitviper with a short, gradually tapering tail.

Young individuals boldly marked, with sharply defined dorsal bands and a light-colored tail.

Similar species

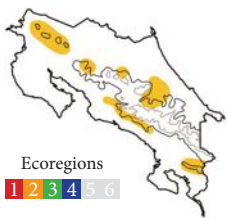
- *Cerrophidion sasai* (p. 590) is the only other pitviper with enlarged plates on top of the head; however, they are not symmetrical. It is restricted to highland habitats.
- *Porthidium ophryomegas* (p. 601) has fragmented head scales and lacks the white facial stripes.

Atropoides mexicanus

Least concern

Central American Jumping Pitviper (*Mano de Piedra Común*)

A very stocky, medium-sized terrestrial pitviper. Has very strongly keeled scales throughout and a raised, middorsal ridge. There is a dorsal series of dark diamond-shaped blotches that is aligned with a series of dark lateral blotches; these lateral and dorsal blotches often connect. Usually lacks a dark blotch below each eye or it is only minimally indicated; the dark postocular stripe is not light-bordered. Total length to 38.6 in (98 cm).



Atropoides mexicanus occurs on the Atlantic slope in disjunct populations from central Mexico to central Panama; In Costa Rica it is also found locally on the Pacific slope. From near sea level to 5250 ft (1600 m).

Natural history

Atropoides mexicanus is a relatively common pitviper that is often found at middle elevations. It is terrestrial; individuals are usually found coiled on the forest floor during the early morning hours. Snakes are active day and night. In areas with a pronounced dry season, activity may shift to the night, whereas at higher elevations, where nights are cool, these snakes may be more active during the day. Observations also show that pregnant females seek out open, sun-exposed spots to bask.

Generally, individuals are located on the forest floor, where they blend in very well with the leaf litter; they are usually seen on or alongside forest trails or tucked in against the buttress roots of trees. *Atropoides mexicanus* inhabits undisturbed forest habitats but can also be found in regenerating forests or other moderately disturbed habitats. The heavy body and the lack of a prehensile tail make climbing difficult for large adults, and they rarely climb onto rocks or logs to bask. Nevertheless, individuals have been found in low bushes; and small juveniles are more apt to climb.

These snakes have keen senses, and they constantly turn their head toward potential sources of threat. If disturbed, they employ an intimidating defensive display in which the body is flattened and the mouth is gaped widely and held open facing the threat. However, these snakes are generally relatively docile and rarely strike. Snakes of the genus *Atropoides* are often referred to as "jumping vipers," due to the erroneous belief that they can strike great distances by actually launching themselves into the air. In reality, *Atropoides mexicanus* is not capable of striking beyond about half of its body length. Despite its intimidating appearance and fearsome reputation, *Atropoides mexicanus* is thought to have relatively weak venom; the few reports of bite accidents involving this species generally involve localized symptoms (pain, swelling) that usually disappear within days.

The feeding strike of this species is different than that of many other terrestrial pitvipers. Those species release prey immediately after striking and follow its scent trail until they find the prey animal after it has succumbed to the snake's venom. In pitvipers with this feeding strategy, contact with the living prey can be as brief as 0.3 seconds, thus minimizing the chance of the snake being injured by a struggling victim. The terrestrial *Atropoides* species, and many arboreal pitvipers, hold the prey in the mouth and run a much higher risk of being bitten or scratched before the victim succumbs. In *Atropoides mexicanus* the heat-sensitive pits and part of the eyes are protected by folds of skin that cover these sensitive organs when the snake bites or has prey in its mouth. Adults of this species predominantly feed on rodents; juveniles eat small lizards and insects (grasshoppers and crickets).

Atropoides mexicanus gives birth to live young; litters of up to 35 babies have been reported, but generally there are far fewer. The timing of reproduction appears to vary regionally, with young being reported from March to June on the Pacific

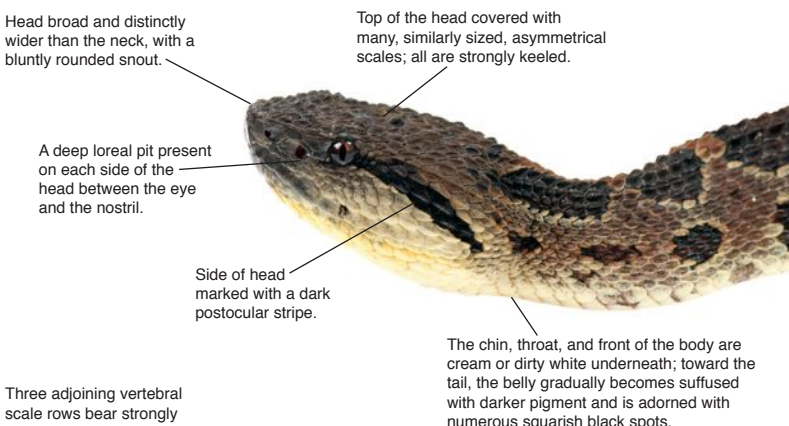
slope, and between August and November on the Atlantic slope. As is the case with many predator species, the arrival of young is synchronized with periods of increased prey availability, which tends to be during the rainy season.

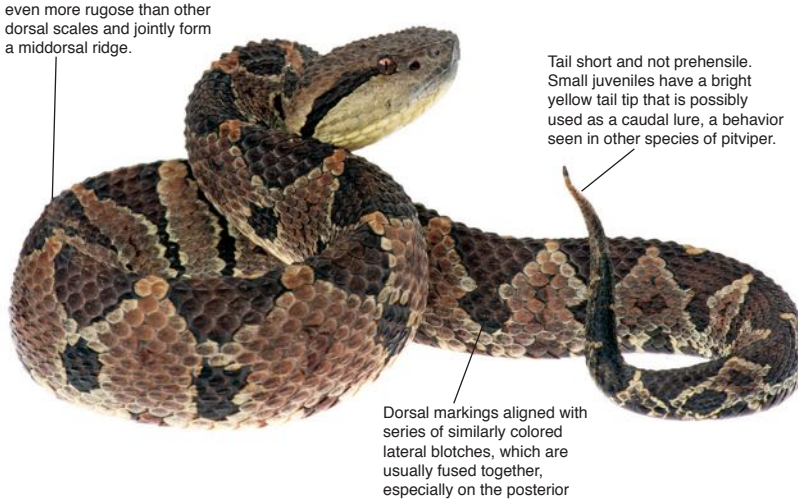
In older literature, this species is included as *Atropoides nummifer*. But that wide-ranging species was split into several geographically isolated forms, and Costa Rican populations are now assigned to *Atropoides mexicanus*.

Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 114–135; 22–39 unpaired subcaudals; cloacal scute undivided.





Atropoides mexicanus displays considerable variation in color and patterning. In some individuals, the lateral markings may form vertical bars instead of blotches.

Similar species

- *Atropoides picadoi* (p. 573) generally has dorsal blotches that are separated from the lateral markings; its vertebral and paravertebral scales are less strongly keeled, and its body is longer and more slender.
- *Lachesis* species (pp. 594–597) are more slender and longer; dorsum marked with inverted triangles or diamonds whose tips point downward, and the tail tip is a long, thornlike spine.

Atropoides picadoi

Least concern

Picado's Jumping Pitviper (*Mano de Piedra Costarricense*)

A robust, large terrestrial pitviper. Has strongly keeled scales throughout, but lacks a prominently raised middorsal ridge. Has a middorsal series of dark diamond-shaped blotches that is aligned with a series of dark lateral blotches; on most individuals, lateral and dorsal blotches do not come into contact. Has a bold dark blotch below each eye and a light-bordered dark postocular stripe. Total length to 49.2 in (125 cm), but generally smaller.

Atropoides picadoi is found in isolated populations at middle elevations on both slopes of the Central and Talamanca mountain ranges of Costa Rica, including the Central Valley, and in the Chiriquí highlands of adjacent western Panama; from 985-6560 ft (300-2000 m). Literature records from the Talamanca Mountain Range and western Panama are likely in error.

Natural history

Although *Atropoides picadoi* can be locally common, it is generally a rarely encountered species of terrestrial pitviper. Its distribution pattern is poorly understood, though it is known to occur at a wide range of elevations. Most reliable records come from middle elevations on the Atlantic slopes of the Tilarán and Central mountain ranges; it is also know to occur on the Pacific slope of the Tilarán Mountain Range. Because it so closely resembles *Atropoides mexicanus*, some records may represent misidentified individuals; in fact, records of *Atropoides picadoi* from the southern Talamanca Mountain Range and from western Panama may represent *Atropoides mexicanus* and require verification. While *Atropoides mexicanus* is commonly reported in both those areas, it should be noted that the two species are known to co-occur in some other areas (e.g., Braullio Carillo National Park) and therefore the occurrence of *Atropoides picadoi* in southern Costa Rica cannot not be entirely ruled out.

Based on the limited information available, *Atropoides picadoi* appears quite similar in its biology and behavior to *Atropoides mexicanus*. It is most often found in undisturbed premontane and lower montane wet forests, usually coiled in the leaf litter near the base of large buttressed-root trees, or in shallow depressions in the forest floor. A few records of individuals found in edge situations in moderately disturbed agricultural areas indicate that it may tolerate some habitat alteration.

Its diet likely consists of small mammals, reptiles, and amphibians. Juveniles are more likely to eat smaller prey such as frogs, small lizards, and possibly insects. Prey is caught with a quick strike from an ambush position and held in the mouth until incapacitated by the venom. Skin folds on the side of the head protect the eyes, loreal pits, and other vulnerable organs from potential damage by struggling prey while the mouth is open.

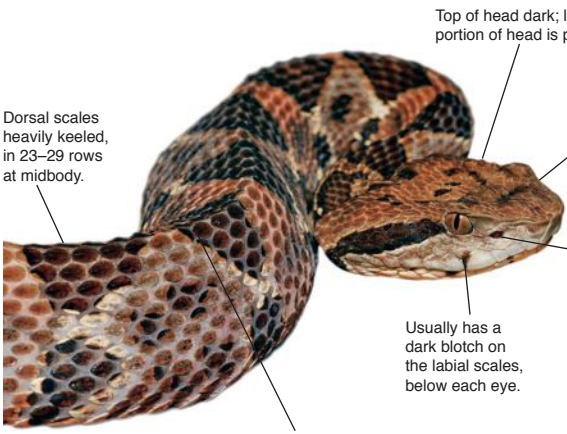
When threatened, these snakes usually flatten their body to appear larger and may strike at the source of the threat. Individuals sometimes engage in an open mouth threat display, gaping widely and displaying the pale interior of the mouth. In general, these impressive snakes are relatively inoffensive. In spite of their common name, they do not jump, and their striking range is barely half their body length. Due to its rarity, no records exist of bites in humans and the effect of its venom is unknown. However, laboratory studies on mice indicate that the venom of this species may be more potent than that of *Atropoides mexicanus*, and apparently has a much higher heamorhagic activity. Bites by this species should therefore always be treated as potentially life-threatening.

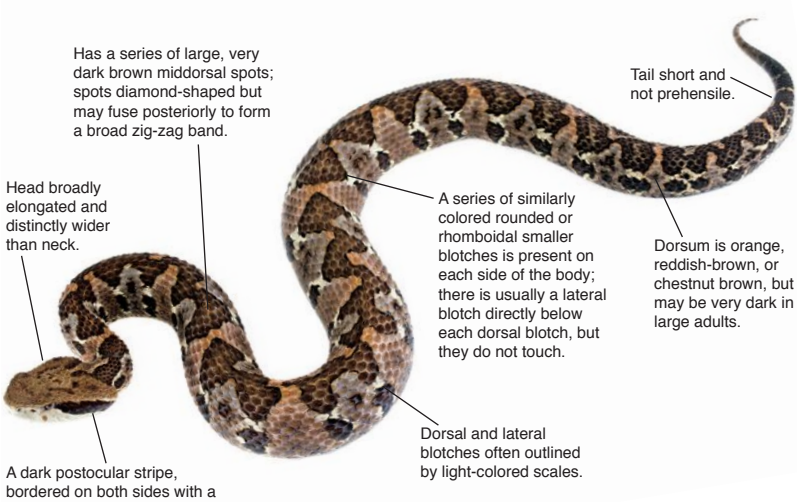
Atropoides picadoi is live-bearing and can produce litters of up to 45 young, although the average litter size is generally much smaller. Young are born during the rainy season, between April and November. Juveniles show an interesting sexual dimorphism in their head pattern; female offspring have a pair of dark spots on the top of their head, which are absent in young males.

Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 138–155; 30–40 unpaired subcaudals; cloacal scute undivided.





Small juveniles have a yellow tail tip. Female juveniles have two dark spots on the top of the head, which are absent in males. These spots disappear with age. Young individuals usually have some orange in their color pattern.

Similar species

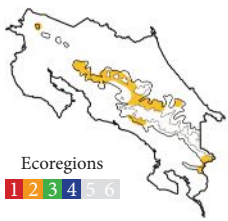
- In *Atropoides mexicanus* (p. 570) the dorsal blotches are usually connected to the lateral markings; its vertebral and paravertebral scales are extremely heavily keeled, almost tubercular, and its body is shorter and squatter.
- *Lachesis* species (pp. 594–596) are more slender and longer. Dorsum marked with inverted triangles or diamonds, with their tips pointing down, and the tail tip is a long, thornlike spine.

Bothriechis lateralis

Side-striped Palm-Pitviper (*Lora*)

Least concern

An arboreal pitviper with a prehensile tail, characterized by its bright green coloration and the presence of a light venterolateral stripe on either side of the body. Dorsal coloration in small juveniles tan or brown. Total length to 37.4 in (95 cm), but generally smaller.



Bothriechis lateralis is found in the Guanacaste, Tilarán, Central, and Talamanca mountain ranges of Costa Rica; it also occurs in adjacent western Panama. From 2790–6890 ft (850–2100 m).

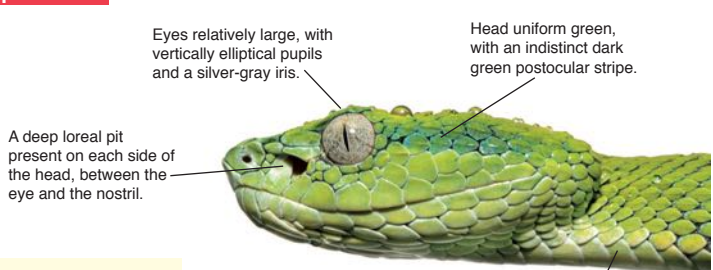
Natural history

Bothriechis lateralis is a relatively common arboreal pitviper. It is found in montane forests that are characterized by high rainfall and dense epiphytic vegetation. It is difficult to spot due to its cryptic coloration. Individuals are most frequently found coiled on vegetation above or near forest trails and streams. *Bothriechis lateralis* is adaptable and can persist in substantially altered habitats, including areas of secondary vegetation, coffee plantations, gardens, and even pastures with some remaining trees or bushes. However, it is not known if these habitat types allow for the continued survival of healthy populations of this species.

Adult *Bothriechis lateralis* feed mostly on rodents and other small mammals, including bats, as well as birds. Juveniles mainly feed on small lizards (*Anolis* spp.) and leaf litter frogs of the genera *Craugastor*, *Diasporus*, and *Pristimantis*. It has been suggested that juveniles may be more terrestrial than adults, hence their brown dorsal coloration. The observation that captive females descend to the ground to give birth seems to strengthen that theory. The brown juvenile color pattern starts fading after about six months, but it may take another year before the shift to a completely green, adult color pattern is complete.

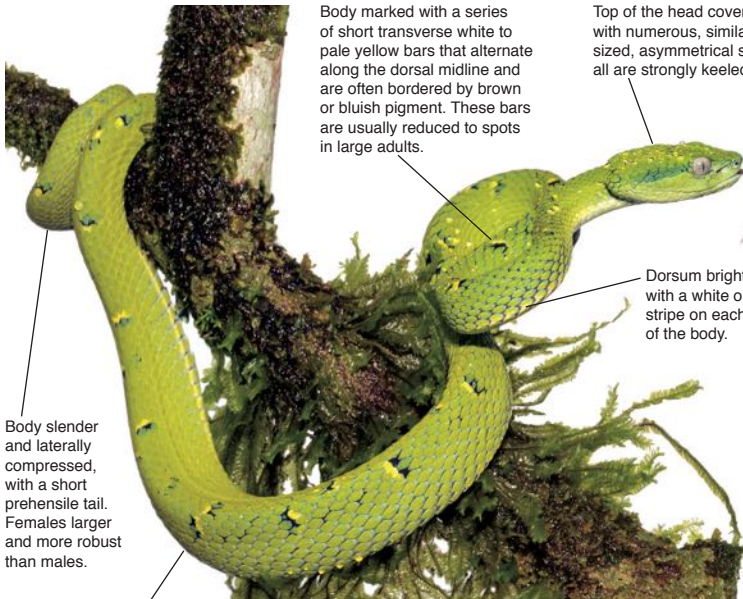
Bothriechis lateralis is live-bearing. Females can give birth to litters of up to 17 young, although litter sizes are usually in the 5–10 range.

Description



DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 157–171; 54–70 unpaired subcaudals; cloacal scute undivided.



Juveniles tan to brown, with dark brown postocular stripes and dorsal bars that are usually edged by a yellow or white bar; light venterolateral stripes are also prominently visible. Tail tip in juveniles bright yellow; gradually darkens with age.

Similar species

- *Oxybelis fulgidus* (p. 372) is the only other snake in the region with a green dorsum and venterolateral light stripes; it has an extremely attenuate head and lacks loreal pits.
- *Bothriechis nubestris* (p. 380) and *Bothriechis nigroviridis* (p. 578) both have a black and green color pattern.
- Green *Bothriechis schlegelii* (p. 582) and *Bothriechis supraciliaris* (p. 585) always have a series of dark dorsal blotches and have distinctive eyelashlike scales above each eye.

Bothriechis nigroviridis

Least concern

Black-speckled Palm-Pitviper (*Toboba de Árbol*)

A boldly marked arboreal pitviper with a prehensile tail; dorsum mottled green and black, very similar to *Bothriechis nubestris*. Has fragmented, small supraocular scales over each eye, and only 1 or 2 rows of scales between lower edge of eye and supralabial scales. Total length to 35.4 in (90 cm); usually smaller.

Bothriechis nigroviridis inhabits the Tilarán, Central, and Talamanca mountain ranges of Costa Rica; it is also found in adjacent western Panama. Found from 2295–9840 ft (700–3000 m), but most records are from above 4920 ft (1500 m).

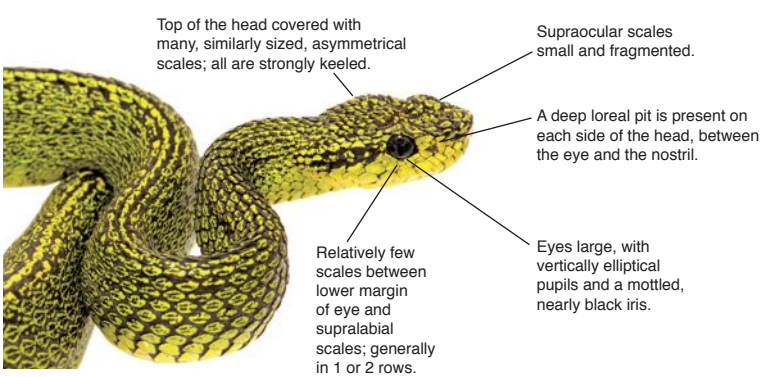
Natural history

This beautiful pitviper is found at low and middle elevations of pristine forests throughout the mountain ranges of Costa Rica. *Bothriechis nigroviridis* does not tolerate habitat degradration and disappears soon after its forest habitat is altered.

This species is arboreal and nocturnal; at higher elevations, where prevailing temperatures drop significantly at night, it may also be active during the day. Gravid females have been observed moving into sunny spots during the early morning hours, presumably to aid development of the embryos. *Bothriechis nigroviridis* is viviparous; it reportedly gives birth to litters of up to 16 young. Most young are born between June and November, when the rains trigger increased reproduction in frogs and lizards, thus ensuring plenty of food for the young. Unlike *Bothriechis lateralis*, the young of *Bothriechis nigroviridis* appear identical in color and pattern to the adults.

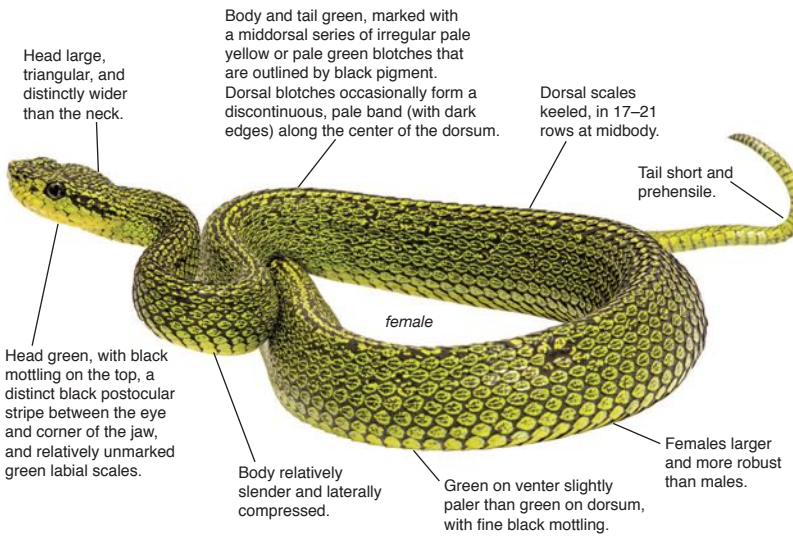
These snakes reportedly prefer blackberry bushes, whose fruits attract a variety of prey. Adult *Bothriechis nigroviridis* mostly eat small mammals (mice and rats), lizards, frogs, and possibly small birds. Prey is caught with a quick strike and held in the mouth until the venom incapacitates it. The effect of the venom on humans is not known; bites are very rare, likely because these snakes inhabitat areas where few people live.

Description



DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 136–149; 48–64 unpaired subcaudals; cloacal scute undivided.



Males have more dark blotches and markings on the dorsum than do females. Juveniles have a pattern similar to that of adults, but have a dark tail tip.

Similar species

- *Bothriechis nubestris* (p. 580) has 150–160 ventral scales; its supraocular scales are kidney-shaped and widely separated from one another.
- *Bothriechis lateralis* (p. 576) is mostly uniform leaf-green and has a light venterolateral stripe running along either side of the body.
- *Bothriechis schlegelii* (p. 582) and *Bothriechis supraciliaris* (p. 585) both have several distinctly raised, eyelashlike pointed scales above each eye.

Bothriechis nubestris

Data deficient

Talamancan Palm-Pitviper (*Toboba de Árbol de Talamanca*)

An arboreal pitviper with striking green and black mottling, very similar to *Bothriechis nigroviridis*. Has a large, kidney-shaped supraocular scale over each eye and 2–4 rows of small, fragmented scales between lower edge of eye and supralabial scales. Total length to 36.2 in (92 cm).

Bothriechis nubestris has been confirmed from the northern and central sections of the Talamanca Mountain Range (e.g., San Gerardo de Dota, Cerro de a Muerte); it may occur in the Central Mountain Range as well. From 7875–9840 ft (2400–3000 m).

Natural history

Bothriechis nubestris is a recently described, cryptic species that was long incorporated in the nearly identical-looking *Bothriechis nigroviridis*. Definite *Bothriechis nubestris* have been recorded from the northern and central sections of the Talamanca Mountain Range of Costa Rica, in the provinces of San José, Cartago, and Limón. Records of this species from the Central Mountain Range are based on location data provided on the labels associated with museum specimens. However, these specimens likely had been donated to the Instituto Clodomiro Picado for the production of antivenom; and while the institute is located in the Central Mountain Range, the snakes may have been brought in from elsewhere. There remains the possibility, regardless, that cryptic *Bothriechis nubestris* are hiding among populations of *Bothriechis nigroviridis* outside of the currently known range.

Bothriechis nubestris differs from *Bothriechis nigroviridis* on a molecular level, but also in minor details of the head scales and ventral scale count. Since both species are so easily mistaken and have only recently been considered separate species, natural history data pertaining strictly to *Bothriechis nubestris* is unavailable. However, its biology is undoubtedly similar to that of *Bothriechis nigroviridis*.

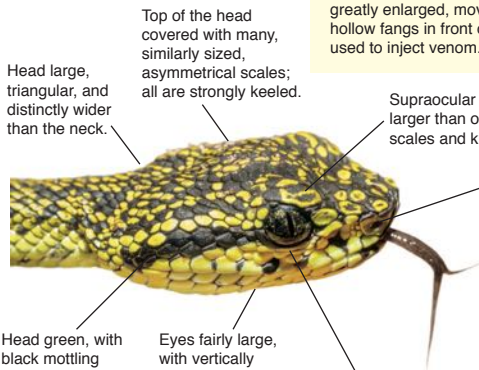
Bothriechis nubestris is usually found in the transition zone between cloud forest and montane rainforest. This species is arboreal and mostly nocturnal; it is usually found coiled up on an elevated tree root or branch, as it waits in ambush for prey. Food items include small mammals, lizards, frogs, and likely birds. Prey is caught with a fast strike and held in the mouth until the effects of the venom immobilize the prey. No information exists on the effects of its venom on humans.

Bothriechis nubestris is live-bearing and likely gives birth to litters of at least 5–10 young.

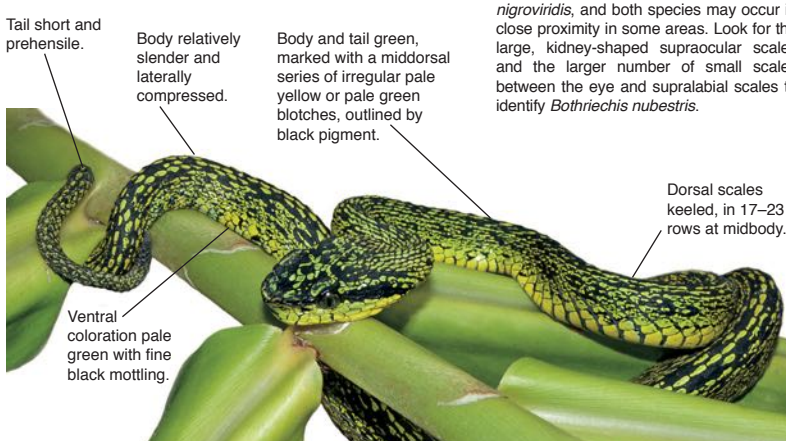
Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 150–160; 52–64 unpaired subcaudals; cloacal scute divided.



Bothriechis nubestris is virtually identical in external morphology to *Bothriechis nigroviridis*, and both species may occur in close proximity in some areas. Look for the large, kidney-shaped supraocular scales and the larger number of small scales between the eye and supralabial scales to identify *Bothriechis nubestris*.



Similar species

- *Bothriechis nigroviridis* (p. 578) has 136–149 ventral scales; its supraocular scales are wide, not kidney-shaped, and are narrowly separated from one another.
- *Bothriechis lateralis* (p. 576) is mostly green (juveniles are brown), with a pair of light-colored venterolateral stripes.
- *Bothriechis schlegelii* (p. 582) and *Bothriechis supraciliaris* (p. 585) have several distinctly raised, eyelashlike pointed scales above each eye.

Bothriechis schlegelii

Least concern

Eyelash Palm-Pitviper (*Bocaracá Común, Toboba de Pestañas, Oropel*)

A medium-sized arboreal pitviper with a prehensile tail. Color pattern is extremely variable; has 1–3 raised, spine-like superciliary scales over its eyes. Generally, with a pattern of poorly defined, diffuse dorsal saddle spots, blotches, or crossbands on the body. Total length to 32.3 in (82 cm), but usually smaller.

Bothriechis schlegelii occurs on the Atlantic slope, from Chiapas, Mexico, to northern Colombia; on the Pacific slope, it ranges from northwestern Costa Rica to northern Peru; near sea level to 4920 ft (1500 m). In Costa Rica, it is most commonly found on the Atlantic slope and in the Pacific southwest, generally below 3280 ft (1000 m).

Natural history

This iconic snake is common to abundant in most parts of its range, and inhabits wet forest types in lowlands and foothills throughout Costa Rica. It is often found in edge situations, along trails or streams, and tolerates secondary vegetation, even plantations and other disturbed habitats. *Bothriechis schlegelii* is primarily nocturnal; it is active at dusk and dawn, spending the daylight hours coiled on tree roots, on branches, or in bromeliads. Individuals are often tucked in beneath aerial roots and vines that cover a tree's trunk. One of the theories about the purpose of the enlarged scales on top of the eyes in this species is that they help guide roots and vines away from the surface of the snake's eyes, thus helping to avoid scratches and other damage.

Juvenile *Bothriechis schlegelii* are often found on the ground or on a low perch, but large adults are arboreal and have been found in the canopy at heights of up to 100 ft (35 m). This age-related shift in microhabitat is likely caused by an associated shift in diet; juveniles mainly eat leaf litter lizards and small frogs, while adults may also feed on small mammals and birds. Juveniles are known to use their brightly colored tail tip as a caudal lure to attract prey.

Like most other pitvipers, *Bothriechis schlegelii* is a sit-and-wait predator. It coils up in a suitable ambush location until a prey animal passes within striking distcance. Prey is held in the mouth after being bitten; a fold of skin covers the heat-sensitive pit and part of the eye when the mouth is open. This skin fold protects sensitive organs from bites and scratches until a struggling prey animal is immobilized by the venom.

Because of its ability to survive in plantations and other man-made habitats, *Bothriechis schlegelii* is likely to come into close contact with plantation workers and farmers; as a result, snakebite incidents involving this species are quite common. A large percentage of these bites are sustained on the head, neck, shoulders, chest, and hands, when workers reach for fruits in trees. Few of these bites are fatal, but permanent local damage to hands is a common side-effect. *Bothriechis schlegelii* will sometimes assume a defensive posture, with the mouth wide agape, before striking.

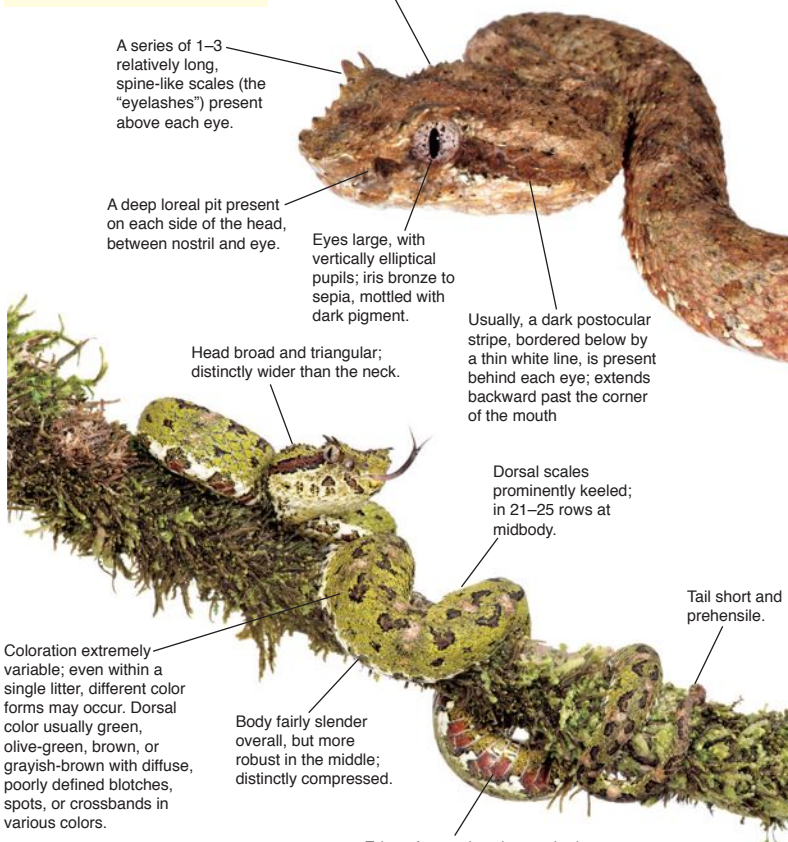
Bothriechis schlegelii is live-bearing; it produces litters of up to 19 young, though smaller litters are more common. Within a single litter, there may be a wide variety of color patterns, ranging from cryptically colored individuals to the yellow *oropel* form. All-yellow individuals may be born from parents neither of whom is yellow.

Bothriechis schlegelii is incredibly variable in its coloration.

Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 138–166; 43–62 unpaired subcaudals; cloacal scute divided.



Small juveniles have a brightly colored tail tip (cream, yellow, or greenish) that contrasts with the body coloration and fades over time.

A characteristic color variety, locally known as *oropel*, exhibits a uniform bright yellow or golden color sprinkled with tiny black specks.

Similar species

- *Bothriechis supraciliaris* (p. 585) is very similar in appearance but is marked with distinctly defined, contrasting dorsal saddle spots; it occurs only at higher elevations in the Pacific southwest.
- *Sibon longifrenis* (p. 512) looks superficially similar but lacks loreal pits and eyelashlike spines over each eye.
- Juvenile *Phrynonax poecilonotus* (p. 384) lack loreal pits and eyelashlike spines over each eye and have round pupils.
- *Imantodes inornatus* (p. 468) can resemble the gold *oropel* form of *Bothriechis schlegelii*, but never has loreal pits or the namesake "eyelashes."

Bothriechis supraciliaris

Least concern

Blotched Palm-Pitviper (*Bocaracá Manchada*)

A medium-sized arboreal pitviper with a prehensile tail; has 1–3 raised, spinelike superciliary scales above its eyes. Color pattern varies; generally has clearly defined, dark outlined dorsal saddle spots or blotches. Total length to 31.5 in (80 cm); generally smaller.

Bothriechis supraciliaris is found in the foothills and at middle elevations of the Talamanca Mountain Range of Pacific southwestern Costa Rica and adjacent western Panama; from 2625 to 5575 ft (800 to 1700 m).

Natural history

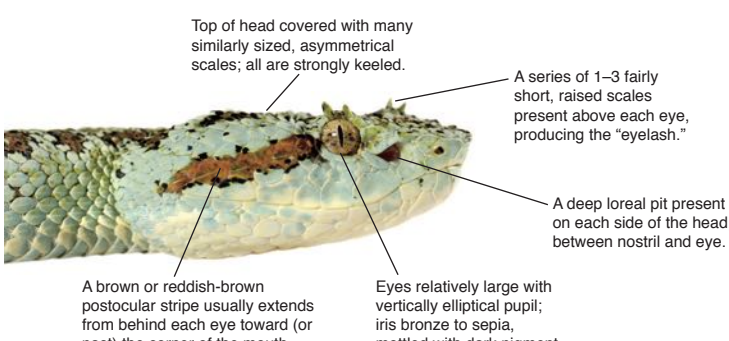
This uncommon snake is very similar in appearance and biology to the much more widespread and more common *Bothriechis schlegelii*. *Bothriechis supraciliaris* has distinctly raised, spine-like superciliaries, like *Bothriechis schlegelii*; however, it occurs in a small geographic area and generally at higher elevations than *Bothriechis schlegelii*.

Most individuals of this arboreal species are found coiled on vegetation near the ground. Likely, smaller individuals are found close to the forest floor, where they can readily access small lizards and leaf litter frogs. As they get older and bigger, a dietary shift toward eating small mammals and birds causes these snakes to move higher into the trees.

Although this is primarily a forest inhabitant, *Bothriechis supraciliaris* is somewhat tolerant of habitat alteration and has been found in regenerating, secondary forest habitats, as well as along the edges of farm fields, so long as sufficient vegetation remains. This arboreal species uses its prehensile tail to move through dense tangles of vines, roots, and branches. The eyelashlike spiny scales over its eyes are thought to guide vines and roots away from the eyes to protect them from damage.

Bothriechis supraciliaris gives birth to live young; no other details are available on its reproductive biology.

Description



DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

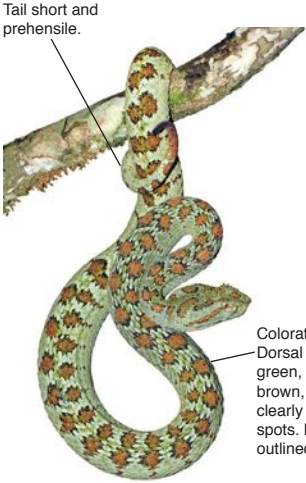
Ventral scales number 141–150; 54–58 unpaired subcaudals; cloacal scute undivided.

Body fairly slender, with a slender neck and more robust middle section; distinctly compressed laterally.

Most scales on the head, body, and tail heavily keeled; dorsal scales in 21–23 rows at midbody.

Head broad and triangular; distinctly wider than the neck.

Tail short and prehensile.



Coloration extremely variable. Dorsal ground color usually green, olive-green, mint-green, brown, or grayish-brown, with clearly defined saddle blotches or spots. Dorsal markings generally outlined with a dark border.

There is a yellow-tan variety, similar to the *oropel* form of *Bothriechis schlegelii*, but it has fairly conspicuous dark dorsal blotches on a yellow background, rather than a uniform golden-yellow coloration.

Similar species

- *Bothriechis schlegelii* (p. 582) is very similar in appearance but is marked with poorly defined, diffuse dorsal saddle spots; it is widespread at lower elevations.
- *Sibon longifrenis* (p. 512) has a similar color pattern but lacks loreal pits and eyelashlike spines over each eye.
- Juvenile *Phrynonax poecilonotus* (p. 384) lack loreal pits and eyelashlike spines over each eye and have round pupils.
- *Imantodes inornatus* (p. 468) can resemble the gold *oropel* form, but lacks loreal pits and the namesake "eyelashes."

Bothrops asper
Fer-de-Lance (*Terciopelo*)

Least concern

A large to very large pitviper with velvety-looking scales and a distinctive pattern of dark triangular blotches on its sides. The narrow tips of these markings often fuse on the midline; the pale edges of the dark triangles form a series of cream chevron or X-shaped markings when seen from above. Total length to 96.8 in (246 cm).

Bothrops asper ranges from northern Mexico to the Pacific lowlands of Colombia and Ecuador. It is widespread in Central America along both slopes, but absent from the arid regions of Pacific lowland Nicaragua and El Salvador. From near sea level to 4920 ft (1500 m). In Costa Rica, it is common on both slopes, but has yet to be detected on the Nicoya Peninsula.

Natural history

Bothrops asper is originally a rainforest inhabitant, but it adapts well to the extensive habitat alteration that has taken place throughout its range. It is most frequently found in dense vegetation of all sorts, ranging from tall grass or scrub to virgin rainforest, and is usually associated with streams or rivers. This species is very common in agricultural areas, where crops attract rodents, but also around human settlements, thus increasing the chances of snakebite incidents.

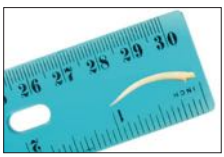
Fer-de-lances are terrestrial snakes, although juveniles, and occasionally adults, will sometimes crawl into low vegetation. These pitvipers spend most of the day coiled and concealed in vegetation. They become active at dusk, when they move to their hunting sites, often at the side of a road or the edge of a trail, where they attempt to ambush prey. Juvenile *Bothrops asper* mainly eat frogs and lizards, and there is a record of one eating an adult caecilian (*Caecilia volcani*); there is also evidence that they occasionally eat invertebrate prey as well. Adults feed on birds and mammals; they may take prey up to the size of opossums (*Didelphis marsupialis*) or rabbits (*Sylvilagus brasiliensis*).

Bothrops asper's excellent camouflage makes it extremely hard to see when it is coiled in leaf litter or partly hidden beneath vegetation. Although they sometimes remain coiled in the beam of a flashlight when they are discovered at night, they tend to retreat shortly after being disturbed. Fer-de-lances flee with surprising speed and agility, usually toward the cover of dense vegetation. On entering plant cover, they sometimes stop and turn around to face the perceived threat. When threatened, individuals vibrate the tail rapidly, producing a clearly audible buzz, and raise the head off the ground. When further provoked, these snakes tend to strike at the source of the threat. Its excitable disposition, strong venom, and large venom glands make this an extremely dangerous snake. *Bothrops asper* is responsible for 90% of the snake bite incidents in Central America, many of which result in serious injury or, sometimes, death. Treatment of bites has become increasingly successful, and with proper medical treatment most victims survive, although there is often permanent injury to limbs or internal organs due to the strong hemorragic action of the venom.

Bothrops asper is extremely well camouflaged, and even large adults can be difficult to see when they coil up on the forest floor. Their pattern of brown stripes and triangles effectively masks their body shape.

Litter size in these live-bearing snakes is positively correlated with the female's body size, and large females can give birth to litters of up to 86 babies. Individuals from Atlantic slope populations tend to grow larger than those on the Pacific slope, and also produce larger litters. Newborn females are typically longer than newborn males. Juveniles and young males have a conspicuous, yellow tail tip.

Description



The fangs in adult *Bothrops asper* can measure more than 1 in (25 mm) in length.

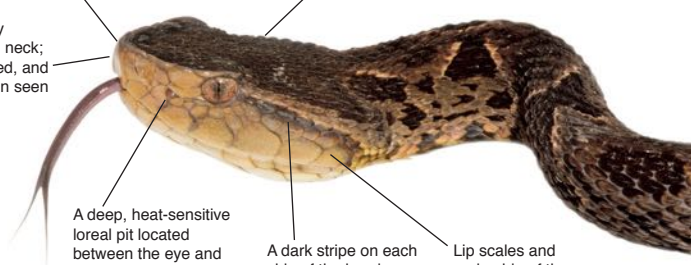
DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 185–220; 56–70 paired subcaudals; cloacal scute divided.

Eyes relatively large, with vertically elliptical pupil; iris, silver-gray to tan, usually matches color of upper lip shields.

Top of the head covered with numerous asymmetrical scales; most are distinctly keeled.

Head distinctly wider than the neck; slender, pointed, and triangular when seen from above.



A deep, heat-sensitive loreal pit located between the eye and the nostril, on each side of the head.

A dark stripe on each side of the head starts behind the eye and extends to the corner of the mouth or slightly beyond.

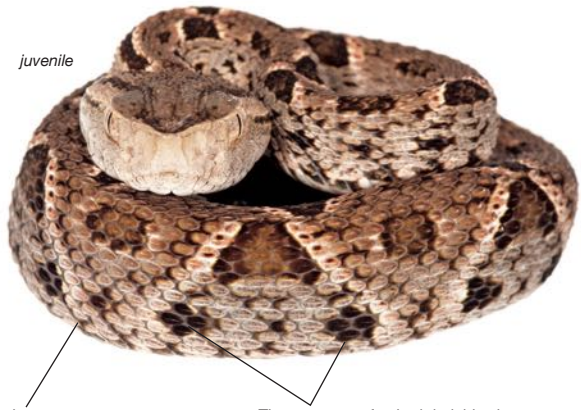
Lip scales and underside of the head and throat are yellowish-cream to yellow, gradually changing into the cream coloration of the belly.

Body, tail, and head dark brown, with a velvety sheen.

Tip of tail pale green, gray, or cream in juveniles; changes with age to dark brown or nearly black in adults.

All dorsal scales keeled; in 23–25 rows at midbody.

Body marked with yellow, cream, or white diagonal stripes, which form chevron or X-shaped patterns; light stripes outline a series of dark-edged triangular blotches.



Similar species

- *Lachesis stenophrys* (p. 596) has a dorsal pattern of inverted triangles or diamonds with the tips pointing down, a distinct middorsal ridge, and knoblike rugose scales.
- *Lachesis melanocephala* (p. 594) has dorsal pattern similar to that of *Lachesis stenophrys*, but the top of its head is completely black.
- *Xenodon rabdocephalus* (p. 540) lacks loreal pits and has large plates on the top of its head arranged in a typical colubrid configuration, smooth dorsal scales, and round pupils.
- *Boa imperator* (p. 315) can appear superficially viperlike, but does not have loreal pits. It has smooth dorsal scales and a pattern that mostly consists of circles and ovals, rather than triangular shapes.

Cerrophidion sasai

Montane Pitviper (*Toboba de Altura*)

Least concern

A small terrestrial pitviper of highland habitats. This is the only pitviper with a characteristic heat-sensitive loreal pit on each side of the head; the head is covered with large, irregularly shaped, unkeeled plates surrounded by small, keeled scales. Total length to 32.3 in (82 cm), but most individuals considerably smaller.

Cerrophidion sasai occurs in the Central and Talamanca mountain ranges of Costa Rica, and in adjacent western Panama. It was recently discovered in the highlands of Nicaragua. From 4595–9840 ft (1400–3000 m).

Natural history

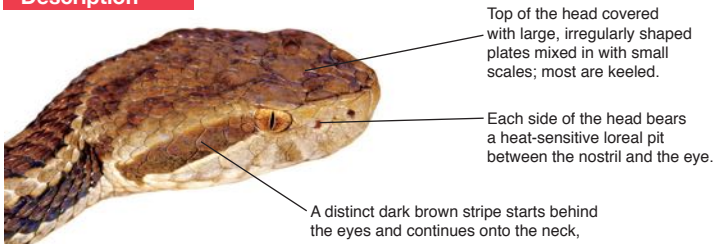
This small highland pitviper can be quite common locally. *Cerrophidion sasai* is terrestrial and secretive; individuals are usually hidden in leaf litter, below vegetation, or underneath logs. This is a diurnal species that emerges from underground burrows or clumps of dense vegetation to bask on sunny days, usually in early morning or mid-afternoon. It is most often seen in edge situations and clearings in forest and scrub vegetation; being fairly tolerant of habitat alteration, it even occurs in vegetable patches, gardens, and other cultivated areas in the vicinity of humans.

Cerrophidion sasai is an opportunistic feeder and recorded prey items include frogs, lizards, snakes, birds, and small mammals; juveniles also take invertebrates. Prey is generally bitten, envenomated, and released, to be ingested later once it is dead; juveniles, however, tend to hold on to their prey until it succumbs. Reports of snakebite incidences involving this species are rare, and the effects on humans tend to be mild. Nevertheless, in laboratory studies its venom showed one of the highest hemotoxic properties of any Costa Rican snake.

Cerrophidion sasai is live-bearing and can produce litters of 2–8 young. It gives birth every other year, which is unusual for tropical snakes. This delay in reproduction is likely due to the prevailing cold temperatures in its high-altitude distribution range. Young are generally born between April and June, at the beginning of the rainy season. Courtship leading up to mating in *Cerrophidion sasai* sometimes involves aggressive male-male as well as male-female interactions, which can include biting.

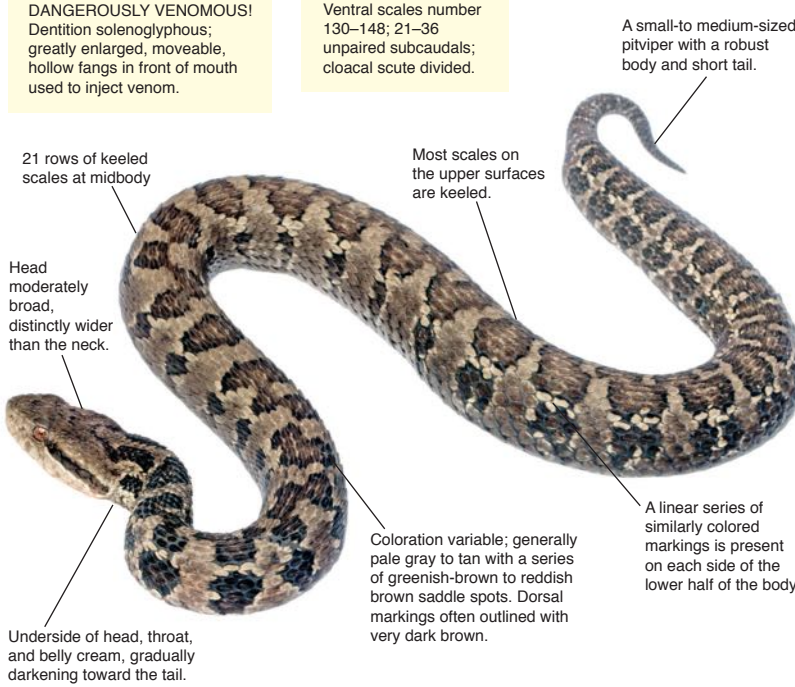
This species was previously known as *Cerrophidion godmani*, a name that is now applied to populations occurring in Mexico and Guatemala. Older literature may also list it as *Porthidium godmani*.

Description



DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 130–148; 21–36 unpaired subcaudals; cloacal scute divided.



Juveniles usually are tan, orange, or ochre; the tail tip is bright yellow to orange. In adults, the pale orange coloration is restricted to the underside of the tail tip.

Middorsal dark markings may fuse to form an undulating dorsal stripe in some individuals.

Similar species

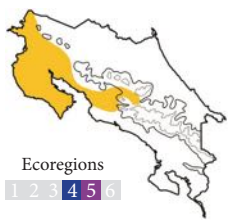
- Other ground-dwelling highland pitvipers within Costa Rica (e.g., *Atropoides* spp.) have fragmented, irregular scales on the top of the head, not enlarged plates.
- Montane pitvipers of the genus *Bothriechis* (pp. 576–586) are predominantly green arboreal species with a prehensile tail.

Crotalus simus

Least concern

Middle American Rattlesnake (*Cascabel Neotropical*)

The only snake in Costa Rica whose tail ends in a segmented rattle (small juveniles sometimes only have a single-segmented "button"). Unique color pattern consists of dark, diamond-shaped spots on the dorsum, combined with a pair of dark paravertebral stripes on the head and neck. Total length to 70.9 in (180 cm) in adult males, 62.2 in (158 cm) in females.



Crotalus simus occurs on the Atlantic slope, from northeastern Mexico to eastern Honduras; it occurs on the Pacific slope, from central Mexico to central Costa Rica; from near sea level to 5250 ft (1600 m). In Costa Rica, it occurs primarily in the dry Pacific northwest, and locally in the western Central Valley.

Natural history

Some 47 species of rattlesnake in the genus *Crotalus* and 3 species of dwarf rattlesnake in the genus *Sistrurus* are distinguished from all other pitvipers in the world by the presence of a highly modified keratinized rattle on their tail tip. In all but the smallest juveniles, this rattle allows the snake to produce an audible buzzing sound by vibrating the tail tip. Only a single species of rattlesnake, *Crotalus simus*, occurs in Costa Rica.

This relatively common species favors dry, open areas. *Crotalus simus* inhabits a variety of habitats, including coastal scrub, rocky outcrops, streamsides, dry forests, farm fields, and backyards. It is a terrestrial snake that rests in a coiled position during the day and actively hunts for prey at night. Adults feed mainly on rodents and other small mammals, as well as spiny-tailed iguanas (genus *Ctenosaura*) and other lizards; juveniles eat smaller lizards and small mammals. Prey is killed with a quick strike and subsequent release; a fast-acting venom usually immobilizes the prey quickly, after which it is consumed. Snakebite incidents involving *Crotalus simus* are rare and with proper medical treatment most people who are bitten recover completely. Fortunately, the venom of Costa Rican individuals does not possess the potent neurotoxic components found in related South American forms. Nevertheless, this is a large and potentially dangerous snake and bites by this species should always be treated as potentially life-threatening.

These formidable snakes display an impressive defensive behavior when approached too closely or threatened in some other way. *Crotalus simus* will raise its head high off the ground, hiss loudly, and face toward and strike at the source of the threat. Throughout this display, it vigorously vibrates the rattle on its tail tip. Nevertheless, when given some room to escape, these snakes will generally flee before engaging in defensive behavior.

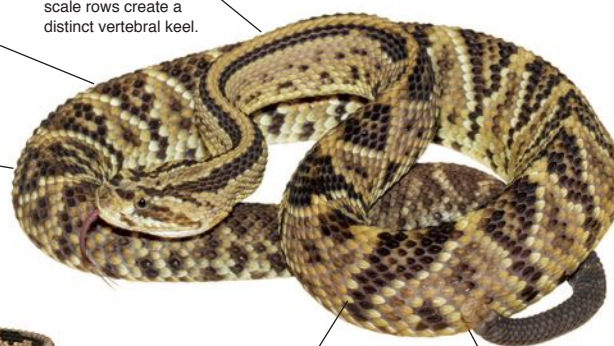
During the mating season, male *Crotalus simus* employ territorial and courtship behavior that includes ritualized combat; two competing males will intertwine their bodies and rear their heads up well above the ground, trying to push each other down. Mating takes place during the early dry season and *Crotalus simus* give birth to live young at the beginning of the rainy season, when prey is abundant. Litters can be as large as 35 young but are generally significantly smaller.

Crotalus simus was historically more widespread than it is now, and ranged well into the Central Valley, including the eastern section, near Cartago. Urban development in the metropolitan area and long-term persecution of these snakes, however, has likely caused them to become extirpated from those areas. This species was previously known as *Crotalus durissus* and appears under that name in older literature.

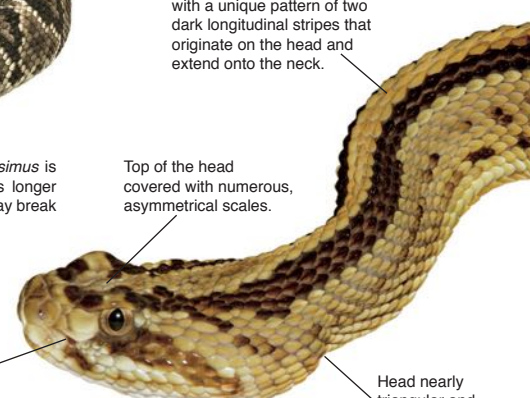
Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 159–195; 19–37 mostly un-paired subcaudals; cloacal scute undivided.



The defensive display of *Crotalus simus* is very impressive. Its rattle becomes longer as the snake ages, but segments may break off over time.



Similar species

- There are no similar species in Costa Rica. There are snakes that make a buzzing sound by vibrating their tail against dead leaves, but they don't have a rattle.

Lachesis melanocephala

Vulnerable

Black-headed Bushmaster (*Plato Negro*)

A very large pitviper with characteristically rugose, knoblike dorsal scales, a pronounced middorsal ridge, and a broadly rounded snout. This is the only pitviper in the country on which the dorsal surface of the head is entirely black. Total length to 94.5 in (240 cm).

Lachesis melanocephala is limited to the lowlands and foothills of southwestern Costa Rica and extreme western Panama; from near sea level to 6145 ft (1873 m). In Costa Rica, it is mostly found on the Osa Peninsula, the lowlands bordering the Golfo Dulce, and locally in the foothills of the Talamanca Mountain Range.

Natural history

Lachesis melanocephala was fairly recently split from the more widespread *Lachesis stenophrys*, which occurs on the Atlantic slope; besides being geographically and genetically separated, there are some morphological differences, most notably the solid black top of this species' head. Otherwise, the behavior and natural history of both species appear very similar. *Lachesis melanocephala* is secretive and occurs in low numbers in hot, humid undisturbed rainforest in the lowlands and foothills of southwestern Costa Rica.

It is terrestrial but also spends considerable time underground in rodent burrows. While on the surface, it is only active at dawn, dusk, and at night, when it hunts for small mammal prey, *Lachesis melanocephala* is an ambush hunter and is usually seen coiled at the base of a large tree, or in the leaf litter near fruiting palms, where fallen fruit attract rodents and other small mammals. Prey is killed quickly with a potent venom. When disturbed, these snakes may rear their head up and vibrate their hard, spine-like tail tip against the substrate, or in the leaf litter, which can produce an audible buzz. Individuals may strike at the source of the threat, but most tend to be relatively mellow and prefer to retreat to safety. Nevertheless, their large size and the large quantity of venom injected during a bite make these snakes extremely dangerous. Due to their relative rarity in areas frequented by humans, bite incidents are rare.

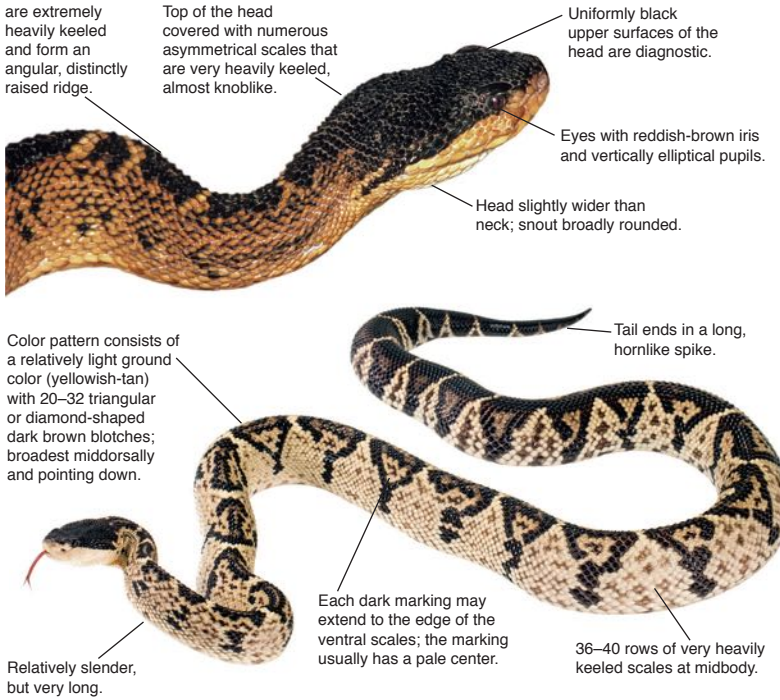
Snakes in the genus *Lachesis* are unique among Neotropical vipers in that they lay eggs; female *Lachesis melanocephala* likely nest in subterranean rodent burrows. Gravid females have been seen basking in sunny spots on the forest floor. In captivity, this species has produced clutches of up to 16 eggs, but details on its reproductive behavior under natural conditions remain poorly known.

Historic records of *Lachesis melanocephala* indicate that it was once considerably more widespread, but loss of large blocks of undisturbed forest due to of the construction of roads, and conversion of land for agriculture, have greatly reduced suitable habitat. *Lachesis melanocephala* is not likely to persist once forest cover is removed or severely altered. Nevertheless, new records of this species from unexpected places keep cropping up and residual populations perhaps still occur on the edges of its distribution range. The recent discovery of this species in the Las Tablas area of the southern Talamanca Mountain Range, in an area of steep, montane oak forest at an elevation of 6,145 ft (1,873 m), extended the known range of *Lachesis melanocephala* significantly in terms of elevation as well as habitat type. Since this is an oviparous species, its distribution is likely restricted to areas that provide adequately high ambient temperatures to successfully incubate the eggs.

Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 209–216; 44 unpaired subcaudals; cloacal scute undivided.



In some individuals the inverted triangle pattern is poorly defined, creating the impression of a broad middorsal dark band, combined with a series of dark vertical bars on the flanks.

Similar species

- On *Lachesis stenophrys* (p. 596), the dorsal surface of the head is tan to yellowish-brown, bordered below by black postocular stripes.
- On *Bothrops asper* (p. 587), the dorsal surface of the head is uniform brown, bordered below by a light postocular stripe; its dorsal scales are keeled, not knoblike.
- *Atropoides mexicanus* (p. 570) and *Atropoides picadoi* (p. 573) also have heavily keeled dorsal scales, but invariably are shorter and substantially more heavy-bodied than any *Lachesis*; they also lack the long spine on the tail tip.

Lachesis stenophrys

Near threatened

Central American Bushmaster (*Matabuey, Cascabel Muda*)

A very large pitviper with extremely rugose, knoblike dorsal scales, a pronounced middorsal ridge, and a broadly rounded snout. Grayish-brown to tan, with a series of black triangular-shaped markings on the body and tail, each with a pale center. Head brown to tan, with pronounced, black postocular stripes. Total length regularly exceeds 78.7 in (200 cm); historic records indicate a total length to 141.7 in (360 cm), making this one of the largest venomous snakes in the world.

Lachesis stenophrys inhabits the Atlantic lowlands, from central Nicaragua to central Panama. From near sea level to 3280 ft (1000 m).

Natural history

Lachesis stenophrys is a shy, secretive, rarely seen species that inhabits dense undisturbed lowland rainforest. These snakes are generally found near large buttress-root trees, or under fallen trees or large logs. At certain times of the year, it is associated with the abundant understory palm *Welfia,* the seeds of which rank among the favored food of spiny rats (genus *Proechimys*) and other rodents that make up a substantial portion of the diet of *Lachesis stenophrys*.

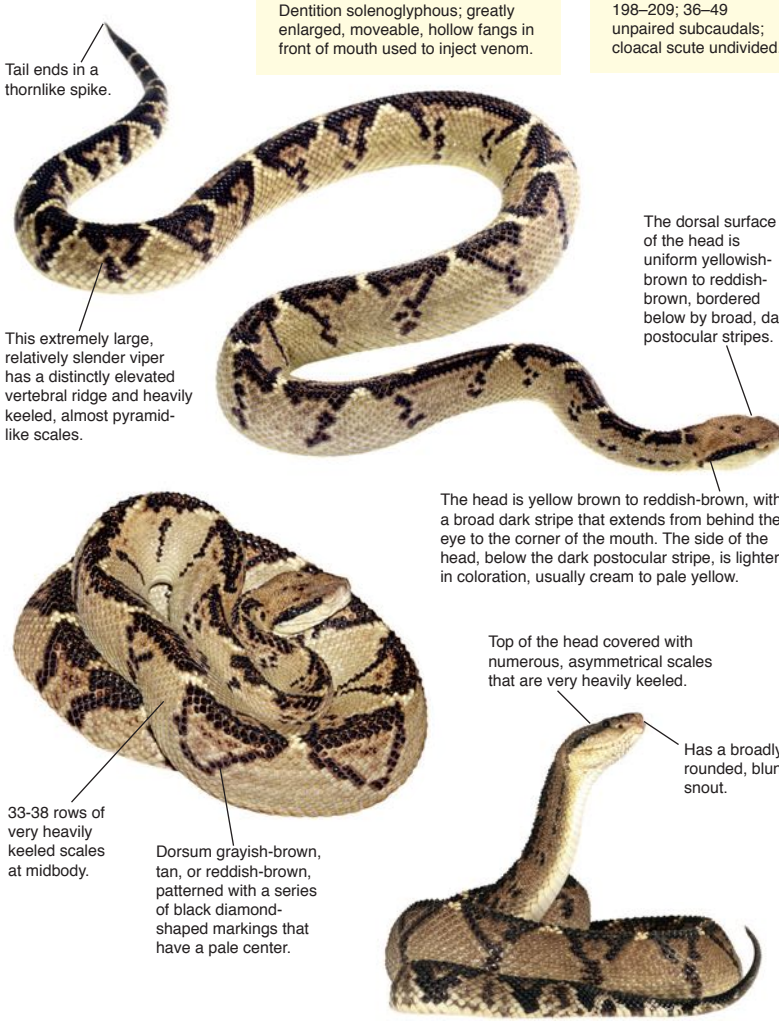
Snakes in the genus *Lachesis* are the only pitvipers that lay eggs. This is likely one of the factors that limits their distribution to hot and humid tropical forests, since the incubation of their eggs requires a high ambient temperature and a high relative humidity. Eggs are deposited in a hollow log, underground in old rodent burrows, or some other subterranean cavity. Clutch size may be as high as 18 eggs, which are usually deposited between June and August and take approximately 2.5–3.5 months to hatch, depending on the elevation and associated ambient temperature. The female will coil around her eggs and remain in the nest for the duration of the incubation period.

As indicated by its local name, *cascabel muda*, the bushmaster is closely related to rattlesnakes. Although *Lachesis stenophrys* does not have a rattle, the hard, spine-like tip of the tail can produce a clearly audible humming sound when vibrated against leaves. This tail-vibrating behavior is part of the impressive defensive display of the bushmaster, which includes inflating the neck and lifting the head off the ground with the front part of the body coiled in an S-shaped curve. *Lachesis stenophrys* has a rather mild disposition, but it will not hesitate to strike at the source of a threat, when harassed. Some reports suggest that males and females may be more irascible during the breeding season (February through March). Females have also been known to actively defend the area where a nest is located. Because of the large size of these snakes, and the large quantity of venom injected during a bite, bites by *Lachesis stenophrys* are extremely dangerous. Due to its rarity in areas frequented by humans, bite incidents are rare, although a bite should always be considered potentially life-threatening. Several bite incidents by this species have ended in fatalities, even after hospitalization and extensive antivenom treatment.

Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 198–209; 36–49 unpaired subcaudals; cloacal scute undivided.



Similar species

- On *Lachesis melanocephala* (p. 594), the dorsal surface of the head is entirely black.
- On *Bothrops asper* (p. 587), the dorsal surface of the head is uniform brown, bordered below by a light postocular stripe; its dorsal scales are keeled, not knoblike.
- *Atropoides mexicanus* (p. 570) and *Atropoides picadoi* (p. 573) also have heavily keeled dorsal scales, but invariably are shorter and substantially more heavy-bodied than any *Lachesis*; they also lack the long spine on the tail tip.

Porthidium nasutum

Least concern

Hognosed Pitviper (*Tamagá Común*)

A small to medium-sized stocky terrestrial pitviper. Has a distinctly upturned snout that bears a proboscis-like extension. Has 22–25 dorsal scale rows and a pattern of 13–23 obscure blotches on the dorsum, usually offset on either side by a very thin middorsal line. Females to 24.8 in (63 cm) in total length, males to 18.1 in (46 cm).

Porthidium nasutum occurs on the Atlantic slope, from Chiapas, Mexico, to eastern Panama; on the Pacific slope, it occurs from central Panama to northwestern Ecuador. From sea level to 4920 ft (1500 m).

Natural history

This common species is generally found on the forest floor of Atlantic rainforests. It is most frequently seen on trails or near buttressed roots of large trees, where its excellent camouflage helps it blend in perfectly amid the leaf litter, often remaining unnoticed by both predators and prey. Although primarily terrestrial, individuals have on occasion been observed climbing onto roots, rocks, or low scrub.

Porthidium nasutum is a sit-and-wait predator, and these snakes are often seen in the same spot for several weeks, waiting for suitable prey to pass within reach. Although technically nocturnal, it is often hard to determine if a snake is "active" if it has not moved for days. Individuals in ambush position have been observed in the same spot for more than two consecutive weeks, but they generally move to a different location if no prey passes for a period of time, or if heavy rains flood the forest floor and force it to move to higher ground.

Juveniles of this species have been observed using their yellowish-green tail tip to lure potential prey to within striking distance. Juveniles eat mainly small frogs but have also been reported to eat earthworms and other invertebrates. As they mature, food preferences change, and adults predominantly feed on lizards, large frogs, and mammals. Most pitvipers eat few, often quite large, prey items. A juvenile *Porthidium nasutum* was reported to have eaten a spiny pocket mouse (*Heteromys desmarestianus*) weighing 129% of its own body weight!

Porthidium nasutum is live-bearing; females may give birth to litters of up to 36 young, but most litters are considerably smaller. Young are generally born during the rainy season (June through December), after a gestation period of 4–5 months.

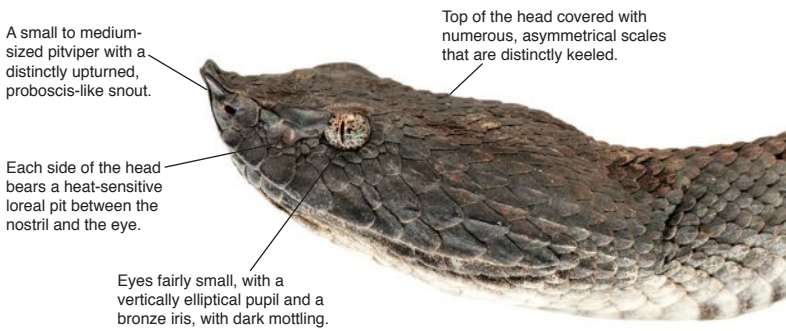
This is a common species that regularly comes into contact with people. Bites are not uncommon, but the medical consequences generally tend to be relatively minor, and limited to localized symptoms. Nevertheless, bites by *Porthidium nasutum* have resulted in human fatalities and should always be considered as potentially dangerous.

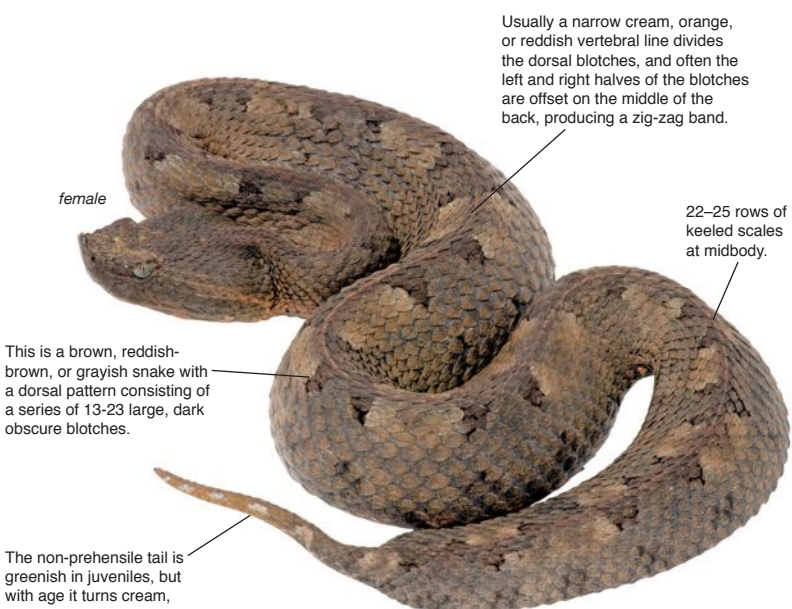
Porthidium nasutum is often found coiled up against buttress roots, fallen logs, and the stilt roots of certain palms.

Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 123–145; 24–41 unpaired subcaudals; cloacal scute undivided.





Large females may have very obscure markings and often lack the vertebral stripe.

Juveniles are noticeably brighter in coloration than adults. The upper surface of their head is normally marked with prominent, pale orange, postocular stripes. The dark sides of the head are usually marked with rows of white spots, forming irregular lines that radiate from the eye to various spots on the upper lip. These light markings gradually disappear with age, but may be visible as light markings on the lower jaw in older individuals, as shown in this photo.

Similar species

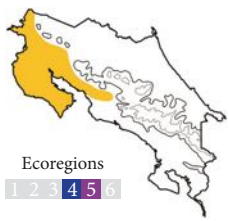
- *Porthidium ophryomegas* (p. 601) lacks a fleshy protuberance on the upturned snout tip. It has 21–41 sharply defined dorsal dark blotches and a bold middorsal line.
- *Porthidium porrasi* (p. 603) has an upturned fleshy protuberance on its snout, a light-colored tail tip throughout life, and its dorsal dark blotches are aligned opposite of one another to form a pattern of transverse crossbands.
- *Porthidium volcanicum* (p. 605) lacks a fleshy protuberance on the upturned snout tip and has 43–50 dark dorsal blotches.

Porthidium ophryomegas

Least concern

Dry Forest Hognosed Pitviper (*Toboba Chinga*)

A small to medium-sized, relatively slender, terrestrial pitviper. The upturned snout lacks a fleshy protuberance. It has a bold dorsal pattern of 21–41 clearly defined, dark blotches that are offset on either side of a light-colored middorsal stripe. Total length to 30.3 in (77 cm) in females, shorter in males.



Porthidium ophryomegas occurs along the Pacific slope of Central America from western Guatemala to northwestern Costa Rica; it also occurs locally on the Atlantic slope in Guatemala and Honduras; from near sea level to 3610 ft (1100 m).

Natural history

Porthidium ophryomegas is a terrestrial, nocturnal inhabitant of lowland dry and moist forests. It is found in a variety of habitats, including secondary vegetation, pastures, and other disturbed areas. It hides under logs and rocks or in piles of vegetation and increases surface activity on rainy nights. It is not uncommon to see these snakes on roads after dark.

A dietary generalist, *Porthidium ophryomegas* feeds on lizards, frogs, and small mammals; small juveniles likely include invertebrates in their diet. There are a few records of this species coiled up, seemingly in an ambush position, in low vegetation or on a rock wall, 4–6 ft (1.2–1.5 m) above the ground. These observations suggest that at times *Porthidium ophryomegas* may hunt for arboreal prey.

This is a live-bearing snake with a seasonal reproductive cycle, giving birth to litters of up to 15 young during the rainy season (May–August).

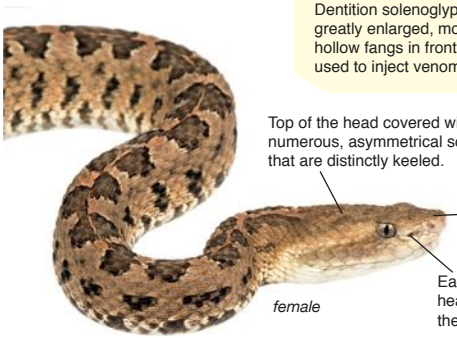
Porthidium ophryomegas kills its prey through envenomation. It tends to bite its prey and release it, only to retrieve it shortly after the venom has taken effect. When threatened, these snakes are quick to defend themselves and bite. Nevertheless, few reports of bites to humans exist. Although rare, limited observations suggest that the effects of the venom of *Porthidium ophryomegas* is relatively mild, and symptoms tend to be localized. Nevertheless, care should be taken around this species.

Like other hognosed pitvipers, *Porthidium ophryomegas* is primarily terrestrial and waits on the forest floor to ambush passing prey.

Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 156–173; 32–46 unpaired subcaudals; cloacal scute undivided.



Top of the head covered with numerous, asymmetrical scales that are distinctly keeled.

Lacks a distinctly upturned, proboscis-like snout. Although the upturned snout is absent, the canthal ridge is sharply defined.

Each side of the head bears a heat-sensitive loreal pit between the nostril and the eye.

female

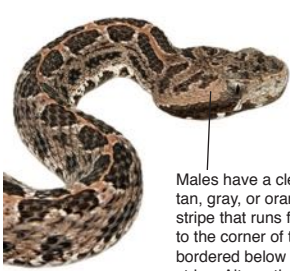
Has a pattern of 21–41 pairs of dark brown to almost black middorsal blotches and a thin light middorsal stripe bisecting these blotches.

23–27 rows of keeled scales at midbody.

female

Poorly defined lateral blotches are located below the dorsal blotches, on a light gray, tan, or brown background.

The venter is pale, cream, or tan, with gray or dark brown irregular markings.



adult male

Males have a clearly defined light tan, gray, or orange postocular stripe that runs from the eye to the corner of the mouth; it is bordered below by a dark brown stripe. Alternating dark and light bars adorn the labials. These markings are only faintly indicated or absent entirely in females.

young male

A young male, in the process of developing the dark area on the upper and lower jaws; it does not yet have a clearly defined light postocular stripe.

Similar species

- *Porthidium nasutum* (p. 598) has a distinct fleshy protuberance on its upturned snout tip and fewer, less clearly defined, dorsal blotches (15–22).
- *Porthidium porrasi* (p. 603) has an upturned fleshy protuberance on the snout tip and a light-colored tail tip throughout life.
- *Porthidium volcanicum* (p. 605) lacks a fleshy protuberance on the upturned snout tip and has 43–50 dark dorsal blotches.

Porthidium porrasi

Least concern

White-tailed Hognosed Pitviper (*Tamagá de Cola Blanca*)

A small to medium-sized, stocky terrestrial pitviper. Has a distinctly upturned snout that bears a proboscis-like extension. With 25–27 dorsal scale rows, and a unique light-colored (white or cream) tail tip. Total length to 19.7 in (50 cm) in females; males considerably smaller, to 14.6 in (37 cm).

Porthidium porrasi is endemic to Costa Rica; it is only known from the Osa Peninsula and adjacent lowlands of the Golfo Dulce area, from near sea level to 655 ft (200 m).

Natural history

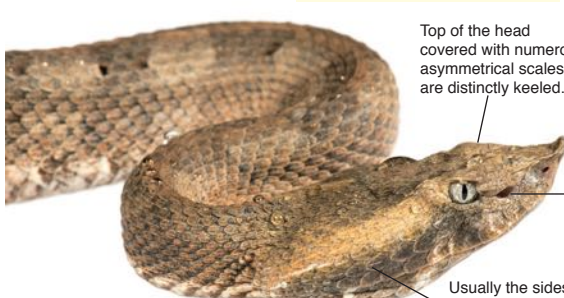
This recently described species was previously thought to represent an isolated, Pacific slope population of the widespread species *Porthidium nasutum*, which it closely resembles. This is a nocturnal, terrestrial species found in the leaf litter of lowland and premontane rainforest. It feeds predominantly on lizards, frogs, and small mammals, which it bites and holds onto until the venom takes effect. Juvenile *Porthidium* are known to use their pale tail tip as a caudal lure to attract potential prey. *Porthidium porrasi* is the only form in the genus that retains this feature throughout life; in other species, the tail tip changes color and darkens with age. It is not known if adult *Porthidium porrasi* employ caudal luring.

Porthidium porrasi gives birth to live young; litters of up to nine offspring have been reported. Females appear to give birth by the end of the dry season or during the onset of the rainy season (March–June).

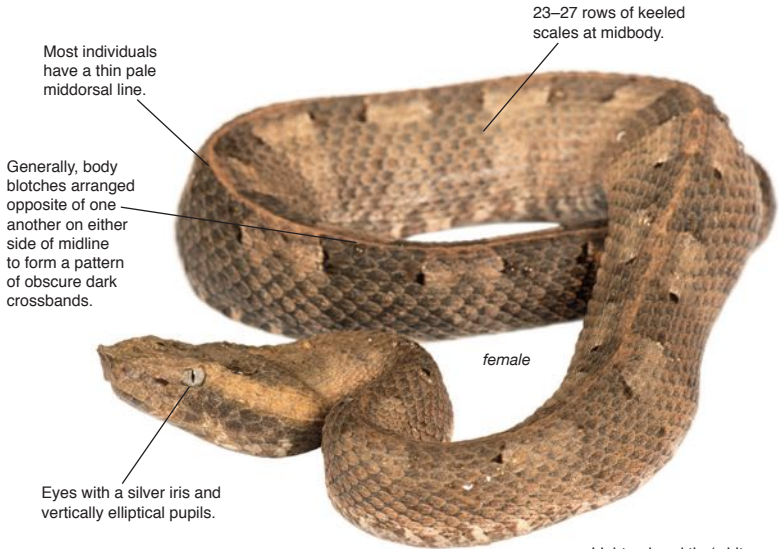
Description

DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

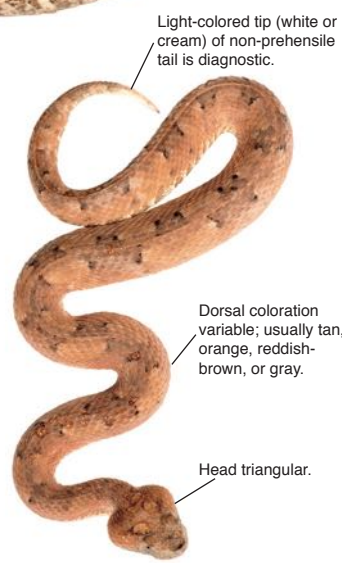
Ventral scales number 136–141; 25–35 unpaired subcaudals; cloacal scute undivided.



female



Females tend to be longer and a much heavier bodied than males; both sexes keep a light tail tip into adulthood (disappears with age in other *Porthidium* species).



Similar species

- *Porthidium nasutum* (p. 598) also has a distinct fleshy flap on its upturned snout tip, but its dark dorsal blotches are usually offset middorsally, and adults have a dark tail tip.
- *Porthidium ophryomegas* (p. 601) lacks a fleshy protuberance on the upturned snout tip. It has 21–41 dorsal dark dark blotches and a bold, light middorsal stripe.
- *Porthidium volcanicum* (p. 605) lacks a fleshy protuberance on the upturned snout tip and has 43–50 dark dorsal blotches.

Porthidium volcanicum

Data deficient

Costa Rican Hognosed Pitviper (*Tamagá Costarricense*)

A rare endemic pitviper whose upturned snout lacks a fleshy protuberance; it has a higher number of dark dorsal blotches (43–50) than any other hognosed pitviper in Costa Rica. Total length to 21.3 in (54 cm).

Porthidium volcanicum is known only from a few individuals found in the Valle del General in southwestern Costa Rica, 1310–3280 ft (400–1000 m), and one individual from the Chiriquí highlands in western Panama.

Natural history

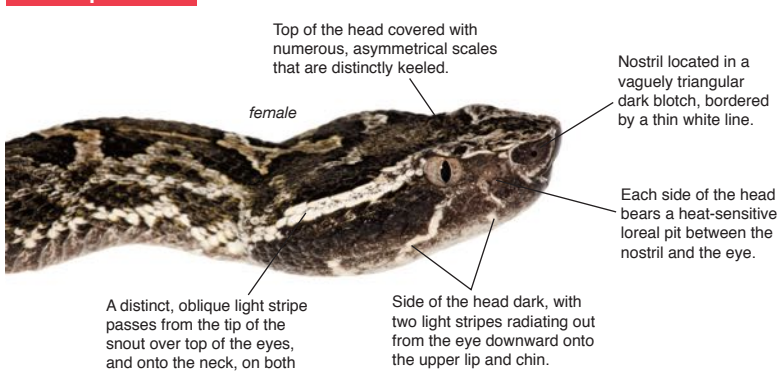
Not much information exists on the biology of this rare species. It is probably terrestrial and nocturnal, like other species in the genus, and has a cryptic color pattern that allows it to blend in well with the leaf litter on the forest floor. It is an ambush hunter and probably feeds on frogs, lizards, and small mammals in the wild.

Porthidium volcanicum was only described in 1994 based on very few specimens collected years prior. Recent searches of the type locality have not turned up any additional specimens. The vegetation in the area where this species was originally discovered is a unique, savanna-like grassland habitat with a pronounced dry season, and *Porthidium volcanicum* is thought to inhabit forest patches surrounded by this grassland. Extensive habitat conversion for agricultural purposes and cattle ranching has likely taken a toll. Nevertheless, reports of this species inhabiting disturbed areas surface occasionally and it likely persists in low numbers in the area. The discovery of old museum specimens from the Boquete area of western Panama, which likely represent *Porthidium volcanicum*, indicate that this species may be more widespread than previously thought.

Scalation details suggest that *Porthidium volcanicum* is more closely related taxonomically to *Porthidium lansbergii* of South America than to the most similar Costa Rican form, *Porthidium ophryomegas*.

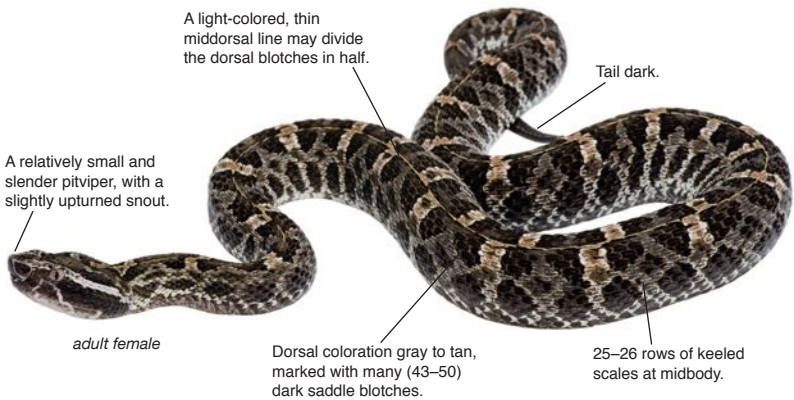
Porthidium volcanicum is probably viviparous.

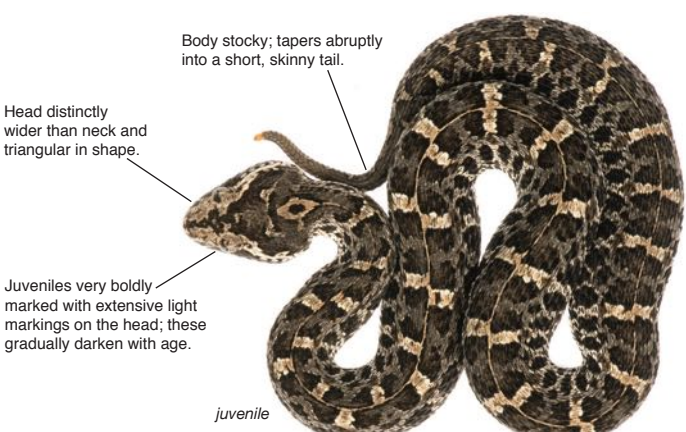
Description



DANGEROUSLY VENOMOUS! Dentition solenoglyphous; greatly enlarged, moveable, hollow fangs in front of mouth used to inject venom.

Ventral scales number 156–165; 25–35 unpaired subcaudals; cloacal scute undivided.





Similar species

- *Porthidium nasutum* (p. 598) has a distinct fleshy flap on its upturned snout tip, and far fewer dorsal blotches (15–22).
- *Porthidium ophryomegas* (p. 601) lacks a fleshy protuberance on the upturned snout tip. It has 21–41 dark dorsal blotches and a bold, light middorsal stripe.
- *Porthidium porrasi* (p. 603) has an upturned fleshy protuberance on the snout tip, and a light-colored tail tip throughout its life.

Glossary

acuminate. *adj.* Tapering to a point.

aglyphous. *adj*. Pertains to the condition of a snake's teeth. In aglyphous snakes, all teeth are unspecialized and roughly of the same size; none are grooved or hollow.

anal plate (or anal scute)**.** The enlarged transverse scale that covers the cloaca in snakes; may be a single scale or composed of two scales (divided).

annulus (plural annuli). A ringlike formation or pattern; often used to describe a continuous row of scales that completely surrounds the tail or body in some reptiles.

anterior. *adj*. Pertaining to the front (head) end of an animal's body.

aposematic. *adj*. Colored in a way to support defensive behavior.

attenuate. *adj*. Slender, thin, tapering.

autotomy. The ability to voluntarily break off part or all of the tail, an antipredator strategy found in many lizards. In **pseudoautotomy** the tail breaks off only when it is restrained by a predator. This ability exists in some snakes.

axilla. The armpit.

axillary. *adj*. Pertaining to the armpit area.

barbel. A fleshy protuberance, often with a tactile function; usually associated with the chin, mouth, or neck.

bipedal. *adj*. Two-legged.

canopy. The ecosystem formed by the crowns and overhanging branches of the trees in a forest.

canthal ridge. The angle of the snout, between the snout tip and the eye, that separates the top of the head from its sides.

canthus rostralis. See **canthal ridge.**

casque. A bony, helmetlike projection of the skull.

caudal. *adj.* Pertaining to the tail.

chemoreception. A faculty of sense perception widespread in amphibians and reptiles.

cloaca. A body cavity where both the urogenital and digestive tracts terminate; opens to the exterior of the body through the **vent**.

cloud forest. A high elevation forest characterized by cool temperatures and high annual rainfall.

co-ossified. *adj.* The condition in which skin is fused to underlying bone.

cryptic. *adj*. Serving to conceal.

cryptic species. A species that is morphologically indistinguishable from other species but differs based on other traits.

cycloid scale. A type of flattened scale with a rounded posterior edge.

dewlap. An erectable fold of skin, supported by the hyoid bone, found in some lizard species, particularly in anoles; the dewlap has a species-specific color and is used for intraspecific communication.

dimorphism. The existence of two different morphologies; in **sexual dimorphism**, the males of a given species look different from the females.

digit. Finger or toe.

diurnal. *adj.* Active during the day.

dorsal. *adj*. Pertaining to the back of an animal.

dorsal stripe. A stripe running along the back of an animal. A **dorsolateral stripe** runs between the back and the side of the animal. A **lateral** stripe runs along the side of the animal.

dorsolateral stripe See **dorsal stripe.**

ectothermous. *adj*. Referring to animals that rely on external sources of heat to maintain their body temperature. All amphibians and reptiles are ectothermous. **Endothermous** animals generate body heat through the internal process of metabolism.

edge situation. The boundary between two habitats.
egg tooth. A hard, sharp structure on the snout of a hatchling reptile that is used to slice open the egg shell, and which falls off shortly after hatching.
endemic. *adj.* A species that only inhabits a restricted geographical area.
endothermous. See **ectothermous**.
fossorial. *adj*. Having burrowing, secretive habits.
gorgetal. *adj*. Pertaining to the dewlap in lizards. **Gorgetal scales** are the scales located on a dewlap.
granular. *adj*. Having a grainy texture; **granular scales** are tiny, non-overlapping scales.
gravid. *adj*. Pregnant, containing eggs.
hatchling. A recently hatched animal.
hemotoxin. A type of toxin that has a hemolytic effect, damaging blood and tissue.
hemipenis (pl. hemipenes). One of the paired copulatory organs found in male lizards and snakes.
herpetofauna. The group of fauna that consists of amphibians and reptiles.
herpetology. The study of amphibians and reptiles.
holotype. A single unique specimen used to first describe the characteristics and name of a new species.
Jacobson's organs. See **vomeronasal organs**.
keel. A raised, longitudinal ridge.
lamellae. The enlarged, transverse scales under the fingers and toes of certain lizards.
lateral. *adj*. Pertaining to either side of an animal.
lateral stripe. See **dorsal stripe**.
leaf litter. The accumulated dead leaves that cover the forest floor.
lichenose. *adj*. Displaying a lichenlike pattern.
longitudinal. *adj*. Running parallel to the axis of the body. Compare with **transverse**.
mandible. The lower jaw.
melanism. Displaying increasing amounts of black pigment.
middorsal. *adj.* The area of the body's dorsal midline.
neonate. A recently born animal.
neotropics. The New World tropics (found in Central and South America).
neurotoxin. A type of toxin that affects the nervous system.
nuchal. *adj.* Pertaining to the dorsal region of the neck;
nuchal collar. A color pattern that appears as a band on the neck.
ocellus (pl. ocelli). A pattern element shaped like a bulls-eye.
ontogenetic. *adj.* Pertaining to the process of aging; the sequence of development in an animal from birth to death.
opisthoglyphous. *adj*. Pertains to the condition of a snake's teeth. In opisthoglyphous snakes, most teeth are unspecialized, but one or two posterior teeth on the upper jaw are enlarged and may be grooved to conduct venom.
osteoderm. Small bones that are embedded in the skin, beneath scales; osteoderms form a protective armor.
oviparous. *adj*. Egg-laying. **viviparous** adj. Live-bearing. **ovoviviparous** adj. Producing membranous eggs that are incubated inside the mother's body; the young hatch and leave the female's body as fully formed juveniles.
oviposition. The act of laying eggs.
ovoviviparous. See **oviparous**.
páramo. *Spanish*. A high elevation habitat with shrublike, alpine vegetation.
paravertebral. *adj.* Located on either side of the dorsal midline
parietal eye. The light-sensitive structure located on the parietal scale, on the top of the head of many lizards.

parthenogenesis. A mode of reproduction that allows an embryo to develop from an unfertilized egg.
pelagic. *adj.* Pertaining to the open ocean.
posterior. *adj*. Pertaining to the rear (tail) end of an animal's body.
postorbital. *adj.* Located behind the eye.
premontane. *adj*. Pertaining to foothills.
primary forest. Undisturbed, old-growth forest. Compare with **secondary forest**.
proteroglyphous. *adj*. Pertains to the condition of a snake's teeth. Proteroglyphous snakes have immobile hollow fangs in the front of the mouth that are connected to venom glands; a condition found in the family Elapidae.
pseudoautotomy. See **autotomy**.
rainforest. Any forest that receives more than 98 in (2500 mm) of annual rainfall.
reticulum. A weblike pattern. A term used to describe the eye or skin pattern of some amphibians and reptiles.
rugose. *adj*. Rough-textured**.**
secondary forest. Partially logged or otherwise disturbed forest, in some stage of regeneration. Compare with **primary forest**.
species group. An informal grouping of similar species.
solenoglyphous. *adj*. Pertains to the condition of a snake's teeth. Solenoglyphous snakes have long, hollow fangs in the front of the mouth that are connected to venom glands. These fangs fold back against the roof of the mouth when closed; a condition found in the family Viperidae.
speciose. *adj*. Containing a large number of species.
spectacle. A transparent covering of the eye, found in snakes, some geckos, and a few other lizard species; formed by the fusion of two eyelids.
striated. *adj*. Marked with parallel streaks or furrows.
sympatric. *adj*. Living in the same area or habitat.
taxon (pl. taxa). Generic name for a taxonomic grouping, such as species or genus.
tetrapod. Any animal with four limbs.
thermocomformer. An animal whose body temperature matches, or deviates very little, from the prevailing ambient temperature.
thermoregulate. The process of regulating body temperature using physiological and behavioral methods.
transverse. *adj*. Running perpendicular to the axis of the body. Compare with **longitudinal**.
tubercle. Any wartlike protuberance.
tympanum. Eardrum; the membrane covering the external ear opening.
understory. The vegetation growing below the canopy.
vent. The opening of the **cloaca**.
ventral. *adj*. (n. venter). Pertaining to the underside of an animal, the belly.
versant. The slope or drainage system of a mountain range.
vertebral. *adj*. Located on the spine.
viviparous. See **oviparous**.
vomeronasal organs. Paired chemosensory organs located in the roof of the mouth of reptiles; the organs receive information from the tips of their forked tongue. Also known as **Jacobson's organs**.
whorl. A continuous ring of scales that completely encircles the tail or body in certain lizards.

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For information beyond the scope of this field guide, or to explore in more detail the biology of Costa Rica's reptiles, there is a great variety of academic resources. An ideal place to start is Savage (2002), an encyclopedic work on the herpetofauna of Costa Rica, loaded cover to cover with detailed information. Solórzano (2004) is a bilingual resource focused entirely on the snakes of Costa Rica. Richly illustrated dichotomous identification keys for all reptiles of Central America can be found in Köhler (2003). These books provide valuable additional information, though they all suffer from outdated taxonomy. Another good starting point is "The Reptile Database" (www.reptile-database.org), an online resource that provides regular updates on changes in taxonomy and distribution.

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Notes

Notes

Elevation (m)

- 2000+ m
- 1500–2000 m
- 1000–1500 m
- 500–1000 m
- 0–500 m

- National parks
- Volcanoes
- Rivers
- Cities

Costa Rica

Nicaragua
San Juan
Medio Queso
Las Crucitas
NORTHERN CENTRAL ATLANTIC LOWLANDS
Caribbean Sea
Sarapiquí
Puerto Viejo de Sarapiquí
Tortuguero National Park
Ciudad Quesada (San Carlos)
Horquetas de Sarapiquí
Parismina
POAS VOLCANO (8,704)
Montaña Azul
Guápiles
BARVA VOLCANO
Central Mountain Range
San Ramón
Grecia
Palmares
CENTRAL VALLEY
TURRIALBA VOLCANO (3,329)
Reventazón
Siquirres
Matina
Limón
Moín
IRAZU VOLCANO (3,432)
Orotina
Santa Ana
SAN JOSÉ
Turrialba
Tárcoles
El Cedral
Cartago
San Rafael de Oreamuno
Paraíso
Platanillo
Ujarrás
Cachí
Barbilla
Carara National Park
Tárcoles
San Ignacio de Acosta
VALLE DE LA ESTRELLA
Cahuita
Punta Uva
Hone Creek
Kekoldi
Talamanca Mountain Range
DOTA REGION
CERRO DE LA MUERTE
Esterillos
Parrita
Mount Chirripó (3,819)
Isla Damas
Quepos
Playa del Rey
San Isidro de El General
Panama
Dominical
S. Pacific Intermontane Valleys
Buenos Aires
Uvita
Pacific Ocean
Coronado
de Térraba
Cortés
Palmar Norte
Térraba
COTO BRUS VALLEY
Sierpe
San Vito
CAÑO ISLAND
Gamba
Golfito
COTO COLORADO VALLEY
OSA PENINSULA
Puerto Jiménez
Corcovado National Park
Zancudo
GOLFO DULCE
Carate
Laurel
Pavones